

THE IRON AGE

Editorial and Executive Offices

239 WEST 39TH STREET NEW YORK, N. Y.

Owned and Published by



CHILTON COMPANY
(Incorporated)

Chestnut and 56th Sts., Philadelphia, Pa.
239 West 39th Street, New York, N. Y.

C. A. MUSSELMAN, President

FRITZ J. FRANK, Executive Vice-President

FREDERIC C. STEVENS, Vice-President

JOSEPH S. HILDRETH, "

GEORGE H. GRIFFITHS, "

EVERIT B. TERHUNE, "

ERNEST C. HASTINGS, "

WILLIAM A. BARBER, Treasurer

JOHN BLAIR MOFFETT, Secretary

FRITZ J. FRANK
President

J. H. VAN DEVENTER
Editor

C. E. WRIGHT
Managing Editor

A. I. FINDLEY
Editor Emeritus

R. E. MILLER
Machinery Editor

F. J. WINTERS
Art Editor

T. W. LIPPERT
Metallurgical Editor

Associate Editors

N. E. MACMILLAN

R. G. BINGHAM

G. RICCIARDI

F. JURASCHEK
Consulting Editor

Washington Editors

L. W. MOFFETT

MORGAN FARRELL

Resident District Editors

R. A. FISKE
Chicago

F. L. PRENTISS
Cleveland

F. J. OLIVER
Detroit

T. C. CAMPBELL
Pittsburgh

Editorial Correspondents

F. B. RICE-OXLEY
London, England

ROBERT G. MCINTOSH
Cincinnati

G. FRAZAR
Boston

P. FIDRMUC
Hamburg, Germany

L. E. MEYER
Milwaukee

LOREN G. IRWIN
San Francisco

F. SANDERSON
Toronto, Ontario

ASA ROUNTREE, JR.
Birmingham

LEROY W. ALLISON
Newark, N. J.

ROY M. EDMONDS
St. Louis

F. T. TURNER
Buffalo

Contents — March 25, 1937

Bigger and Better Depressions	27
Buick Improves Forging Practice	28
Core-Loss Tester for Electrical Sheets	30
Which Grain Size	34
How Arc Welding Cuts Costs of Jigs and Fixtures	38
Better Drive Methods	40
Machine Tools Go Modern	44
New Equipment	46
Statistics on Metal-Working Activity	52
Rate of Activity in Capital Goods	53
Automotive Industry	54
Washington News	58
NEWS CONTENTS	64
Plant Expansion and Equipment Buying	109



New Industrial Literature	115
Just Between Us Two	124
Products Advertised	128
Index to Advertisers	154

Copyright 1937 by Chilton Company (Inc.)

C. S. BAUR, General Advertising Manager

A. H. DIX, Manager Reader Service

Member, Audit Bureau of Circulations

Member, Associated Business Papers

Indexed in the Industrial Arts Index.

Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, \$6.00; Canada, \$8.50; Foreign \$12.00 a year. Single copy, 25 cents.

Cable Address, "Ironage, N. Y."

ADVERTISING STAFF

Emerson Findley, 621 Union Bldg., Cleveland

B. L. Herman, Chilton Bldg., Chestnut & 56th Sts., Philadelphia, Pa.

H. K. Hottenstein, 802 Otis Bldg., Chicago

H. E. Leonard, 239 W. 39th St., New York

Peirce Lewis, 7310 Woodward Ave., Detroit

C. H. Ober, 239 W. 39th St., New York

W. B. Robinson, 428 Park Bldg., Pittsburgh

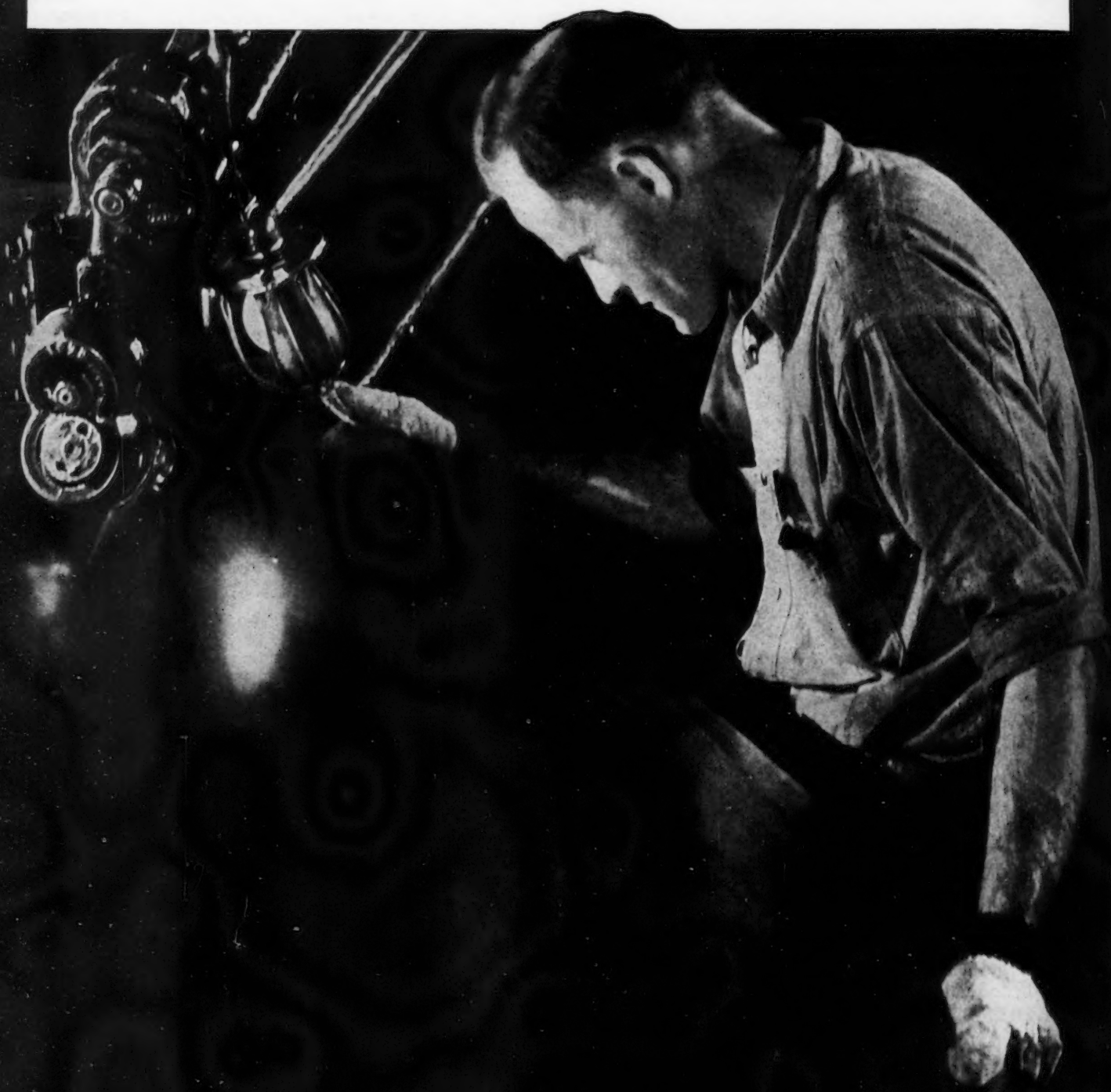
D. C. Warren, P. O. Box 81, Hartford, Conn.

SHEETS that clear the way for even more beautiful automobiles

It's the drawing qualities of sheets that fix the limits of what the body designer can do. Bethlehem sheets are already known for their exceptional deep-drawing qualities and every effort is being devoted to the task of making sheets that will stand even more drastic treatment.

All of the experience of an organization making

every kind of steel product—a system of metallurgical control that permits holding the most precise balance of physical properties through heat after heat—facilities that include the latest refinements for the manufacture of fine sheets and strip contribute to the steady increase in ability of Bethlehem sheets to take the punishment inflicted by the die presses.



BETHLEHEM STEEL COMPANY

▲▲▲ THE IRON AGE ▲▲▲

MARCH 25, 1937

ESTABLISHED 1855

Vol. 139, No. 12

Bigger and Better Depressions

REGARDLESS of what the new school of political experts say, we have not yet seen our last depression. To assume that we have would be to deny the past experience of hundreds of years and to repudiate the axiom that "what goes up must eventually come down."

The important question, it seems to us, is not "will we have another depression" but "shall we be in better or worse position to weather it."


Today we are besieged, as perhaps never before, with the plea to exchange old and tried ideas for new ones. Far be it from us to depreciate the value of new ideas. We can use plenty of them in our business. But it is not wise to jump at them until we are sure that they are better than the old ones.

In the realm of political economy, an idea must be depression-tested before it can claim to be good. Most of the ideas that we are now being asked to accept have not proved themselves able to resist depressions. Indeed, they appear to have the unfortunate quality of preparing for "bigger and better depressions."

Take the corporate surplus profits tax for example. By dissipating corporate nest eggs as soon as they are hatched, this act will place corporations in extremely vulnerable position when the next depression comes along. There will be no carrying on through corporate savings as was the case in the last depression, when our industries spent \$19 billions of savings to keep plants going and men at work.

Take the social security act also. The effect of this, when in full force, will be to hand employers a bonus of from \$90 to \$270 a year for every man that can be pried off the payroll. This, in addition to saving the wages of the discharged employees.

Of course, now that business is good, no one likes to think about future depressions. But, since the President has mentioned the possibility of a forthcoming crisis, one may be pardoned for indulging in speculation regarding the factors that may make it more difficult to meet, when and if it comes. Especially so since inflation, the greatest of all depression builders, has been given such a good head start through the payment of the imaginary political debt to Mr. Lewis' squatting minority.



Buick Takes

Based on an interview with

ROBERT H. DARNTON

*Superintendent of the Forge Division
Buick Motor Co.*

BUICK 40 crankshaft billets are rough rolled in two blows in the first die impression and finished in the second with five blows in this huge 16,000-lb. Chambersburg steam hammer. Output: 55 cranks an hour.



FOR the second time in a year, Buick Motor Co. has increased its manufacturing efficiency in the forging of crankshafts by installing the heaviest duty high speed forging hammer obtainable. This increase in efficiency has resulted not only in lower costs in the forge shop, but in subsequent machining operations as well, for the crankshafts are made not only in less time, but much more nearly to finished size. In fact, the goal ultimately aimed at is to make forgings accurately enough and with so little stock removal necessary that they can be thrown directly into the rough grinders without preliminary machining operations.

Some of the steps taken to modernize forging practice were re-

lated in an article that appeared in *THE IRON AGE* for Oct. 3, 1935. During that year the company had expended over \$700,000 of a \$15,000,000 rehabilitation program in modernizing the forge shop. Most spectacular units added were four 12,000-lb. steam hammers. Two each went into lines for making crankshafts for the large and the small 8-cylinder engines that Buick has adopted to cover four series of cars. At the time these hammers were installed they represented the greatest advance in forging hammer design in a decade. For one thing, by their use, the draft required for pullout was reduced from 7 deg. to 3, thus reducing the amount of metal going into chips, and concurrently lessening the machining time. Such a requirement

is met with a hammer having a sharp, fast rebound to prevent the crank sticking in the die. Rebound is related to the absorption of impact by the anvil and also by the amount of steam admitted to the under-side of the piston at the start of the upward stroke. The hammers installed then had such characteristics. So has the new 16,000-lb. hammer. Rebound is improved by making the ratio of the total anvil weight to the weight of the falling parts 25 to 1, instead of 15 to 1. Furthermore, a relatively large lower cylinder inlet through multiple ports produces a fast return of the ram and aids pullout, and the building up of back pressure above the piston assures strong subsequent blows. Similarly on the downstroke, back pressure on the

Another Forward Step in Forging Practice

piston is avoided through the use of these large lower ports.

Power to strike a blow and quick pullout for low-draft forgings are not all the factors necessary for best forging practice. It is essential that upper and lower dies register properly and that they stay in line after continued use. Both the new 16,000-lb. hammer and the 12,000-lb. hammers bought in 1935 have massive cast steel frames, roughly of I-beam section tapering in pyramid form from a wide base, necessary to give the structure stability. The bearing areas and sections are much wider than ordinarily considered standard. Where it meets the anvil, the frame is stepped, tongued, grooved and overlapped. Connecting bolts have massive coil springs under their nuts and are anchored by cross keys inserted through holes machined from

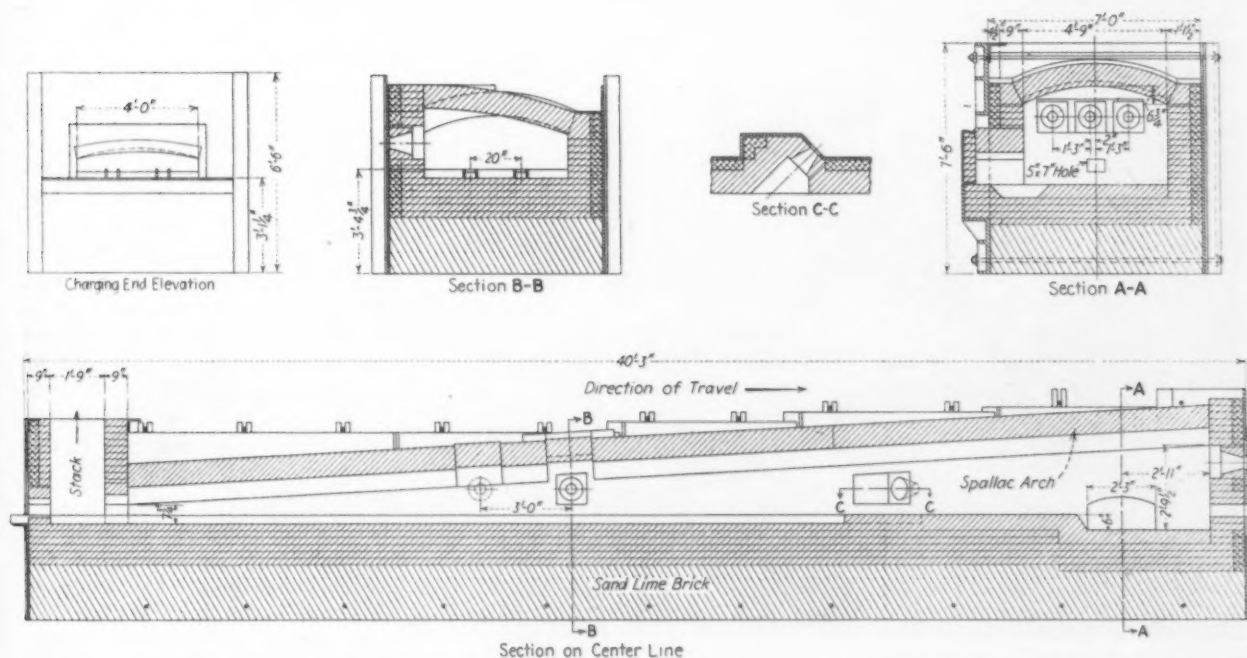
the solid anvil casting, thus avoiding the use of box cores and attendant weakness.

The same general design characteristics have been incorporated in the new 16,000-lb. Chambersburg Model E hammer installed this past fall. The step forward has been to accomplish in one hammer of much larger capacity what had formerly been done in two, with two separate handlings. The number of blows necessary to form the forging has been reduced to a minimum. By using a much heavier blow, it has been possible to eliminate the breakdown operation and greatly reduce the number of blows. For example, it took 4-5 blows to roll and block the billet in the first 12,000-lb. hammer and 12-15 blows to finish forge the crank in the second hammer. In the 16,000-lb. hammer, there are two impressions

in the die. The billet is rough rolled with two blows and finished in the second impression of five blows, making seven in all against 16-20 in the smaller hammers. Yet these smaller hammers are so far ahead of Buick practice prior to late 1935 as to make no comparison possible, because of the great strides made in increasing quality. Part of the reduction in forging time is due to the work being carried on at a higher temperature, since the stock has little chance to cool in the brief interval it is in the hammer. In fact, the terrific impact is partially expended in heat and this tends to raise the temperature.

Another factor that has made this fast forging time possible is the fact that the crankshaft for the Series 40 Buick engine is an ideal one to make. In the flat, before be-

(CONTINUED ON PAGE 50)



THIS oil-fired heating furnace of Buick design feeds 4-in. square billets to the 16,000-lb. hammer. A short pusher conveyor, outside the furnace and not shown, pushes the work along heat-resisting alloy rails.

A Single Strip, Core-Loss Tester

CLOSER and closer limits are being required for the homogeneity and uniformity of electrical sheets. Magnetic and electrical losses are being increasingly looked for and guarded against. Hence the develop-

ment of improved means for detection.

In this article, Mr. Smith describes a new development in apparatus for this purpose, namely a single strip core-loss tester.

o o o



ONE of the problems confronting the technologist today in the production of electrical sheets is the question of how to measure quantitatively the magnetic and electrical losses over various parts of the sheet and also to obtain representative test specimens without destroying large quantities

*A. S. T. M. Standard Methods of Test A 34-33.

of the material. For this purpose it is desirable to have a core-loss test equipment which will test small portions of the sheet. Such a device would be useful, not only for determining homogeneity and uniformity, but as an economical aid to the metallurgist for developing new alloys and treatments.

Unfortunately, the present standard Epstein Core-Loss Tester* cannot be used for this purpose,

nor can it be modified to meet the requirements. The size of the standard test specimen, 50 cm. by 3 cm., is too large and the quantity of material required (10 kg.) too voluminous. About 16 years ago the General Electric Co. developed a modified Epstein test equipment which required a test specimen 25 cm. by 3 cm. and weighed but 1.25 kg. This was a distinct advance in the economy of sampling and has proved its worth for routine tests in the mill and factory laboratories. A general view of this equipment is given in Fig. 1.

After a number of years of experience with this tester, the increasing demand for better quality of the sheet made it evident that a single-strip tester would be a very great aid. With a test set of this type, conditions in the various parts of the sheet could be readily determined; a sheet could be sampled without destroying a large portion of it, and the metallurgist could find out from a single strip the most suitable heat treatment and alloying procedure. It would also be economical, not only because of the saving of material, but because of the size of metallurgical furnace equipment required and of the time reduction in test procedure.

For this purpose a single strip core-loss tester was developed and built, a view of which is shown in Fig. 2. By its use advances have been made in the development of magnetic sheets, and much new data obtained which was heretofore impracticable to measure. It can be used to supplement equipment shown in Fig. 1.

The single strip core-loss tester described below was designed for 60-cycle core-loss measurements at flux densities ranging from $B=8000$ to $B=15000$. It gives results comparable to those obtained by the Epstein method, the comparison be-

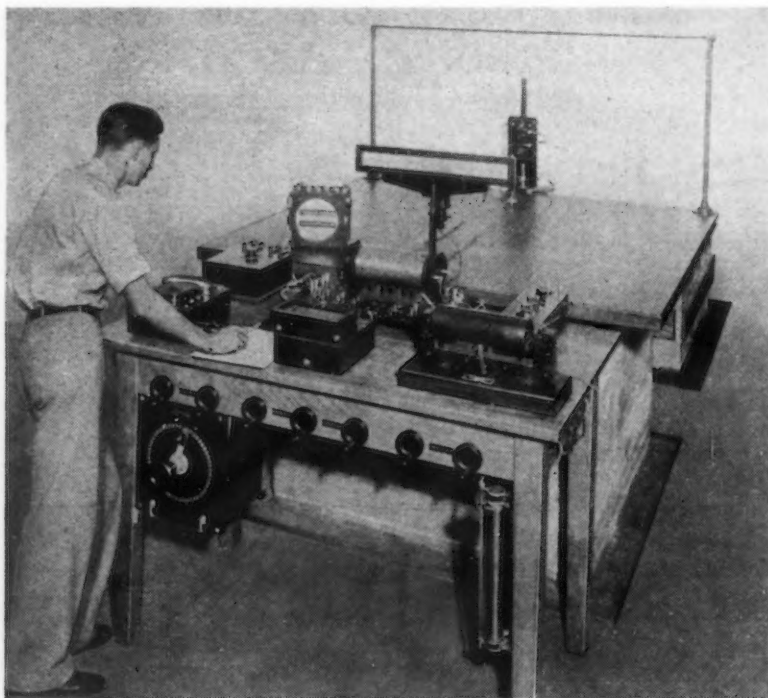


FIG. 2

G. E. Single strip, core-loss testing equipment for samples 25 by 3 cm.

For Electrical Sheets

By B. M. SMITH

General Engineering Laboratory,
General Electric Co., Schenectady

ing between the average loss per strip by each method. Accuracies within 5 per cent are obtainable. The complete equipment as shown in Fig. 2 consists of a tester, reflecting dynamometer wattmeter, ammeter, control panel, decade resistance box, lamp-stand and scale, transformer, and flux voltmeter. A schematic connection diagram is given in Fig. 3.

An end view of the tester is shown in Fig. 4. It is neatly and sturdily constructed, the overall height being 18 in. and the base 15 in. by 6 in. It is designed to accommodate a single test specimen 25 cm. by 3 cm. and of any thickness between 0.010 in. to 0.031

in., inclusive. The strip is gripped in clamps mounted on the yoke at the ends of the test coil. The test

coil is made up of an energizing and two potential windings connected to three pairs of binding

FIG. 4
G. E. Single strip
core-loss tester
from left end,
oblique view.

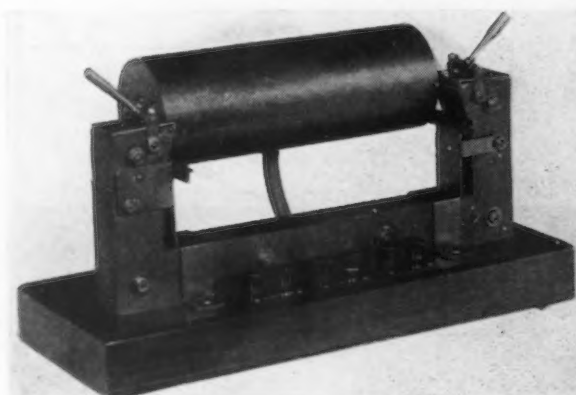
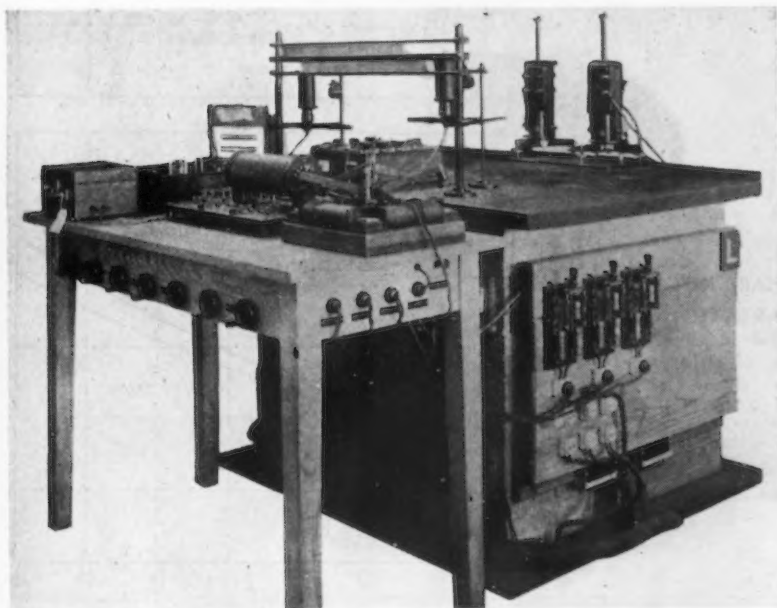
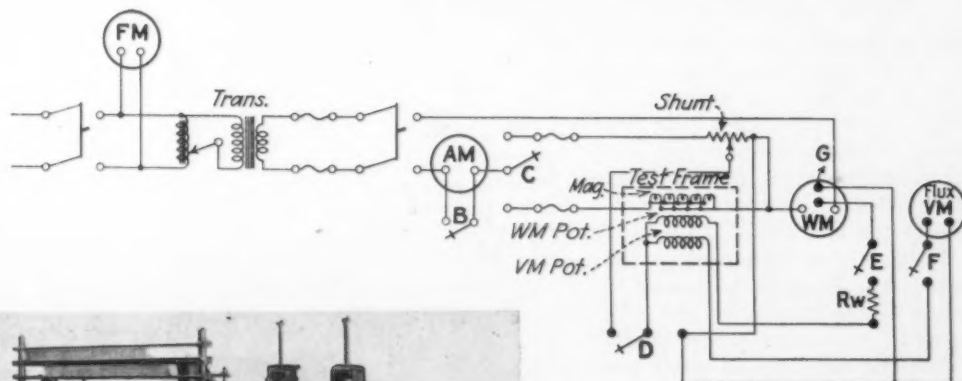


FIG. 3
SCHEMATIC con-
nection diagram
for core-loss tester.

FIG. 1
CORE-LOSS test-
ing equipment
for 1.25 kg. sam-
ples of sheet steel.



posts mounted on the base. The coil is so constructed as to permit its being slid forward on brackets for inserting the test specimen. The test yoke is made up of U-shaped laminations of a high-grade silicon steel so constructed as to permit the test specimen to fit snugly between the poles, one of which is adjustable.

The test procedure after the preparation of the test specimens (shearing, weighing, labeling) is to insert the test specimen in the test coil so that the projecting ends are equal. The coil is slid into position between the poles and the

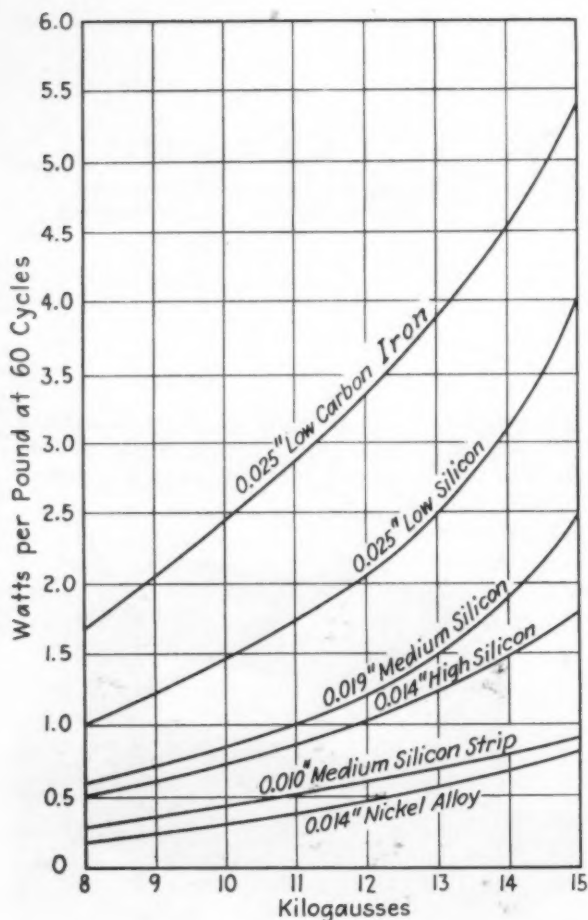


CHART NO. I
TYPICAL core-loss curves obtained on several grades of electrical sheets by single strip core-loss tester.

In Chart No. II curve data are given to demonstrate the loss differences in sheet with grain direction. It is possible to cut a single strip in any direction to determine the effect of rolling in any portion of the sheet or strip. Chart No. III shows the variation in loss in different parts of the strip all in the "with grain" direction. This was taken on medium silicon strip steel 0.010 in. thick.

In Chart No. IV the effects of treatments are shown. These treatments can be carried out on a single strip under very closely controlled temperatures, atmospheres, or solutions and with small size equipment and small quantities of materials and gases; thus experimental work can be carried on very economically.

Conclusions

Compared with other core-loss test methods, the most important feature of the single-strip tester is that the actual quality of a single strip is determined instead of the average quality of a large number of strips in parallel. Thus such

right-hand pole moved against the end of the specimen, so that the two ends butt squarely against two poles in the recesses provided. The ends are then clamped into position. A predetermined voltage is then held by the flux voltmeter and applied to the test coil. The loss to be determined is then read on the wattmeter. From this reading is subtracted the instrument and yoke loss and from the remainder is calculated the core loss in watts per lb. or watts per kilogram in the test specimen.

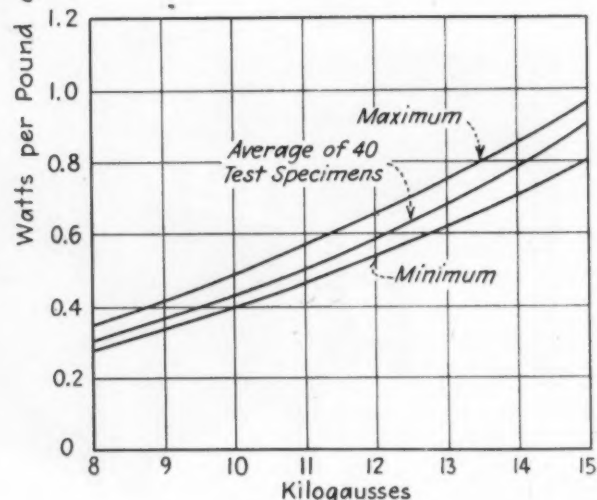
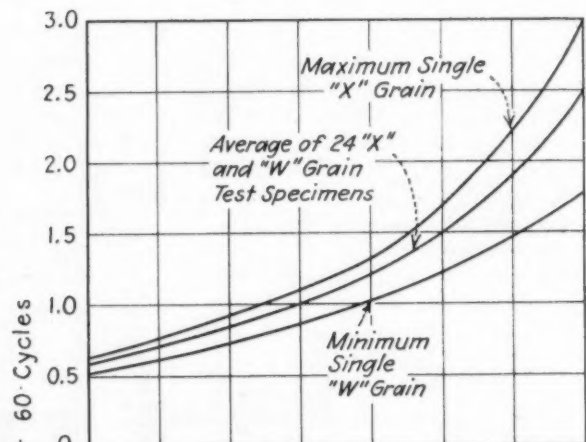
Performance and Results

Some of the data and graphic curves for a few grades of electrical sheets will be examined and described to show actual results and their usefulness.

In Chart No. I are given core-loss data obtained by the single-strip tester on several grades of magnetic sheet steel. These data are representative of that obtained by the Epstein method or other accepted methods. They illustrate the range of flux densities and the extremes in high and low loss materials usually encountered.

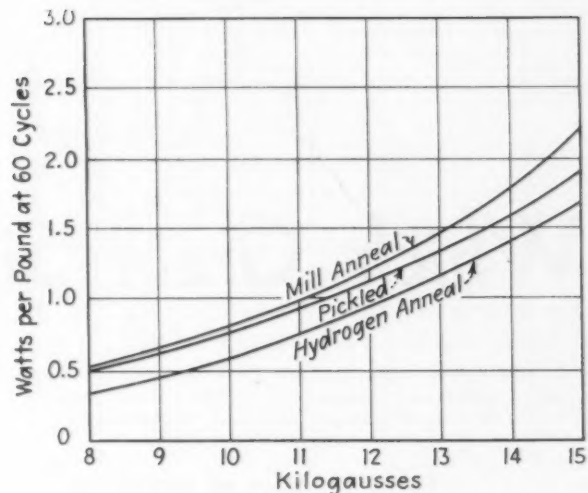
CHART NO. II
LOSS differences in sheet with grain direction; medium silicon sheet steel 0.019 in.

CHART NO. III
VARIATION of loss in different parts of strip; medium silicon strip steel 0.010 in. All "W" grain.



studies may be made as to the effect of "rolling direction," homogeneity, uniformity, stress and various treatments. The size of the test specimen lends itself very readily to metallurgical research, as it is often inconvenient to prepare and treat large quantities of material and large-size specimens such as required for routine acceptance tests. Although the apparatus described requires careful handling, it is very rapid and can be used for routine testing by any semi-skilled operator. The test range of induction is adequate and the extremes in loss measurements are satisfactorily covered.

CHART NO. IV
EFFECT of treatments on medium silicon sheet steel 0.014 in.



A SCENE FROM LONDON

AT the works of Messrs. Harland and Wolff, North Woolwich, London, one may observe, almost any day, this magnificent display of fireworks. It is the accompaniment to the cutting of mild steel by the oxyacetylene process, used in the repair and building of ships and barges.



Which Grain Size?

By C. H. HERTY, JR.,
D. L. McBRIDE and
E. H. HOLLENBACK

INTEREST in and application of the McQuaid-Ehn test has in the past few years increased to a point where this test is specified on a very large tonnage of various grades of steel, especially the carburizing and forging types. Consequently, a new development, such as the authors describe herein, is of major importance. The first section of this article, presented last week, reviewed standard McQuaid-Ehn test procedure and showed the fallacy of indiscriminately utilizing the grain size observed in this test for predicting properties developed in treatments other than carburizing. This concluding section deals with grain size and hardenability, stresses the importance of grain surface and presents data on hardness penetration and surface hardness.

• • •

Grain Size—Grain Surface

The most important feature of grain size undoubtedly lies in its influence on hardenability and the various properties of the steel following hardening treatments. In order to discuss this subject properly, it will be advisable to demonstrate the relationship between grain size, *grain surface* and the reactions which take place during the cooling of steel.

In air cooled hypoeutectoid plain carbon steels, ferrite and pearlite are formed as a result of the decomposition of austenite. If the steel is very slowly cooled, the amount of ferrite formed may be

calculated from the composition of the steel. With more rapid rates of cooling, less and less ferrite is formed because the equilibrium transformation range is passed through so quickly that a large part of the austenite remains undecomposed until a high supercool has been reached. Under these conditions austenite transforms into fine pearlite, lower in carbide and richer in ferrite, than a true pearlite of eutectoid composition.

The ratio of the ferrite formed on air cooling to ferrite formed on annealing can, therefore, be used to determine the rate of decomposition of the austenite on air cooling. If two samples of the same steel be so treated that two different grain sizes are obtained, the effect of grain size on the rate of

decomposition of austenite may be determined by the ferrite ratio mentioned above. McBride, Herty, and Mehl¹ studied this effect of grain size on the amount of ferrite formed on air cooling in various sized cubes. It was found that the ratio

Per Cent Ferrite Formed on
Normalizing divided by the
Per cent Ferrite Formed on
Annealing

when plotted against grains per sq. in. in the normalized sample gave smooth curves as shown in Fig. 3, indicating that the amount of decomposition was proportional to grain size. The larger the cube, the greater the amount of ferrite formed on air cooling for a given grain size.

From the grains per sq. in. the grain surface per cu. in. of steel was calculated from the following equation:

$$S = 4\sqrt{G}$$

where S = sq. in. grain surface per cu. in. at 100 diameters, and G = grains per sq. in. at 100 diameters.

In this calculation it was assumed that the grains were spheres. The ferrite ratio when plotted against *grain surface* per cu. in. gave a straight line for each size of cube employed, as shown in Fig. 4. This was a very definite indication that the rate of decomposition of the austenite was a direct function of

¹ D. L. McBride, C. H. Herty, Jr. and R. F. Mehl: "The Effect of Deoxidation on the Rate of Formation of Ferrite in Commercial Steels," Transactions A.S.M., Vol. 24, No. 2, p. 281.

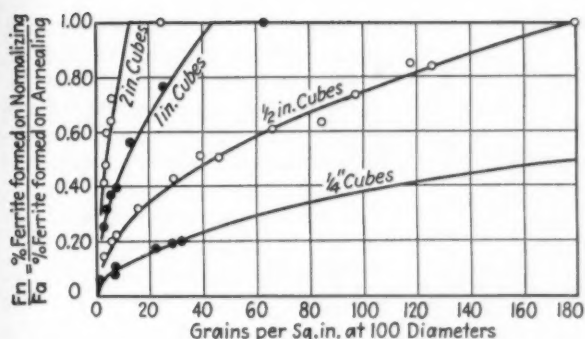


FIG. 3—Effect of grain size and mass on the ratio of ferrite formed during normalizing and annealing. The larger the cube, the greater the amount of ferrite formed on air cooling for a given grain size.

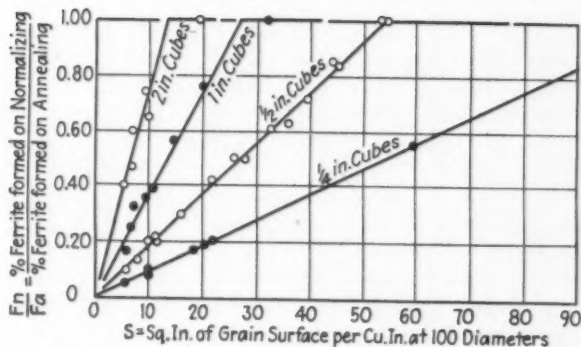


FIG. 4—Effect of grain size and mass on the ratio of ferrite formed during normalizing and annealing. Data plotted by using the equation $S = 4\sqrt{V}G$.

the grain surface per unit volume of steel.

For the reader's convenience Table V has been compiled to show the relation between A.S.T.M. grain size number, grains per sq. in. at 100 diameters, and square inches of grain surface per cu. in. at 100 diameters, as calculated from the foregoing equation.

It should be noted that in order to double the grain surface, the important factor, it is necessary to quadruple the number of grains per sq. in., i.e., an increase of two grain size numbers.

Grain Size and Hardenability

In order to obtain the maximum hardness for a given chemical composition, it is necessary that the austenite decompose into martensite. In carbon steels, austenite will not decompose into martensite on quenching unless the decomposition takes place at about 200-300 deg. F. or lower. This means that the steel must be cooled so rapidly that no austenite decomposition takes place until these temperatures are reached. The rate at which the steel must be cooled in order to fulfill the above condition is called the critical cooling rate.

It has just been shown that the rate of austenite decomposition is a direct function of the grain surface for any given cooling rate, the larger the grain surface, i.e., the smaller the grain size, the more rapid the decomposition. Therefore, the critical cooling rate is greater for fine-grained than for coarse-grained steels. If the critical cooling rate at any point is reached or exceeded, grain size will have no effect upon the actual hardness values, the values then being determined entirely by the composition of the steel.

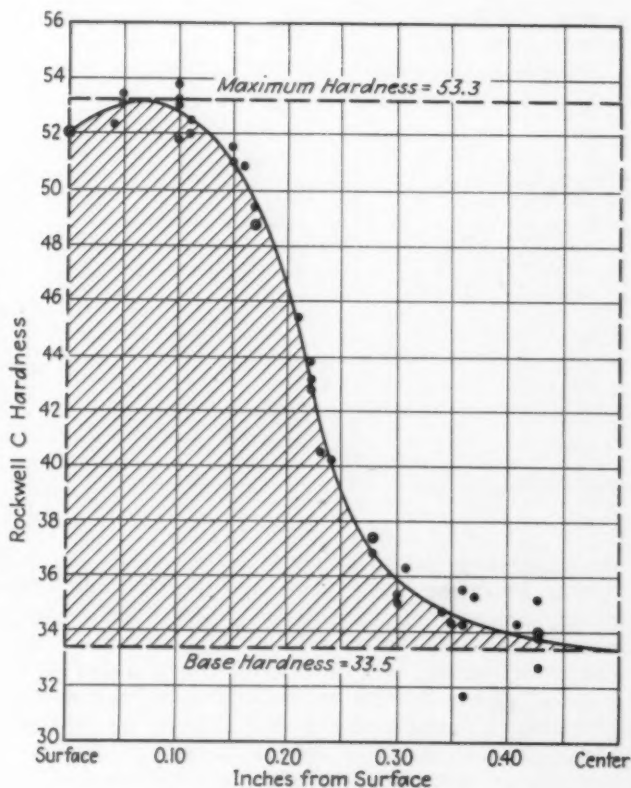
The penetration of hardness in a quenched piece may be judged by fracture and observation and by magnetic methods, or by direct hardness readings on a cross-section of the hardened piece. Excellent standards can be set up for any of these tests as, for example, the Shepherd P-F ratings. In the present work, in order to obtain as accurate an evaluation as possible for hardness penetration, it was decided to use hardness readings on six radii of the cross section of a hardened one-inch round. These hardness readings when plotted against distance from the surface give the familiar curve for hardness penetration as shown in

Fig. 5. The upper horizontal dotted line of this area represents the maximum hardness found on the hardness penetration curve. The lower horizontal dotted line, called the base hardness, is obtained for each steel from Fig. 6, which shows core and maximum hardness plotted against hardness factor. This figure was obtained by plotting the core hardness for fine grained steels and the maximum hardness for all steels studied against a hardness factor involving steel analysis as follows:

$$3000C + 800Mn + 500Si + 4000P = \text{Hardness Factor}$$

where the elements are expressed in per cent. The reason for choos-

FIG. 5—Hardness penetration below the surface of a 1-in. round bar, with an analysis of 0.48 C, 0.84 Mn, 0.017 P, 0.040 S and 0.22 Si, water quenched at 1550 deg. F., and drawn at 500 deg. F. Grains per sq. in., 196 at 100 diameters; 47.3 per cent hardened.



ing this "base hardness" is that it is the average minimum core hardness obtainable for a 1-in. round under the heat treatment chosen, viz: a 1550 deg. F. water quench followed by a 500 deg. F. draw.

The relative hardness penetration, hereafter called the "per cent hardened," is taken as the shaded area under the hardness penetration curve, divided by the total area bounded by the heavy dotted lines on Fig. 5.

into account in calculating "per cent hardened" when the base hardness is calculated from the chemical composition.

The grain surface in which we are interested here is that which is formed at the heat-treating temperature and not that shown by the McQuaid-Ehn test. This is particularly true of coarse and mixed grained steels in that test. In order to determine the effect of grain size on hardness penetration,

in order to determine the austenitic grain size at the time of quench. From the austenitic grain size, determined by counting, the square inches of grain surface were calculated and plotted against the per cent hardened for each sample, the per cent hardened being determined as illustrated in Fig. 5.

Fig. 7 shows the relationship between per cent hardened and square inches of grain surface. The straight line relationship between per cent hardened and grain surface, over the entire range of steel analysis given in Table VI, shows definitely that hardness penetration is a function of grain surface alone.

As shown in Fig 6, a 0.60 per cent carbon steel has a higher base hardness and maximum hardness than a 0.30 per cent carbon steel, and the base hardness and maximum hardness increase regularly with increase in percentage of hardening elements. If chemical composition within the range studied directly affected hardness penetration, the steels shown in Table VI would give points falling on different lines on Fig. 7 instead of falling on a single line as they do. In other words, a change in chemical composition, within the range of analysis studied, simply raises or lowers the level of actual hardness values in the piece, without changing the type of penetration curve.

In general, fine-grained steels are considered to be shallow hardening and coarse-grained steels deep hardening. Fig. 7 shows that the depth of hardness penetration for a given analysis of steel is directly proportional to the grain surface involved. This in turn is a function of the grain size at the heat treating temperature. Having determined this grain size, the actual per cent hardened may be easily determined by calculating the grain surface and referring directly to Fig. 7.

All this discussion refers to the range of analyses shown in Table VI. The effect of alloying elements on hardness penetration is not dealt with in this paper.

Surface Hardness

It was stated in the previous section that the surface hardness of a quenched steel would be independent of the grain size and dependent only on chemical composition, provided the critical cooling

TABLE V

Grain Size Relationship

A.S.T.M. Grain No.	Grains per Sq. In., at 100 Diameters	Sq. In. Grain Surface per Cu. In., at 100 Diameters
1	1	4.0
2	2	5.6
3	4	8.0
4	8	11.3
5	16	16.0
6	32	22.6
7	64	32.0
8	128	45.3
9	256	64.0

TABLE VI

Analyses—Steels Used in Hardness Penetration Experiments

Steel No.	C	Mn	P	S	Si
A-98	0.49	0.74	0.016	0.032	0.22
A-99	0.38	0.75	0.027	0.031	0.20
B-13	0.41	0.78	0.020	0.034	0.23
B-66	0.37	0.70	0.026	0.029	0.21
B-72	0.38	0.78	0.018	0.040	0.21
B-87	0.57	0.77	0.017	0.032	0.23
C-13	0.37	0.74	0.015	0.030	0.20
C-15	0.44	0.72	0.017	0.033	0.19
C-23	0.46	0.73	0.035	0.035	0.20
C-29	0.58	0.71	0.024	0.033	0.17
C-31	0.39	0.71	0.018	0.034	0.20
C-37	0.61	0.76	0.017	0.028	0.21
C-38	0.57	0.74	0.014	0.030	0.24
C-61	0.45	0.73	0.014	0.024	0.19
C-68	0.45	0.71	0.020	0.032	0.19
C-86	0.59	0.79	0.020	0.030	0.21
C-91	0.55	0.54	0.017	0.035	0.21
D-12	0.44	0.68	0.015	0.030	0.20
D-13	0.48	0.76	0.019	0.036	0.23
D-15	0.38	0.75	0.017	0.033	0.19
D-23	0.48	0.84	0.017	0.040	0.22
D-30	0.35	0.68	0.034	0.038	0.18
D-32	0.46	0.74	0.022	0.026	0.20
D-33	0.44	0.74	0.015	0.035	0.18
D-47	0.58	0.74	0.018	0.032	0.22
D-50	0.43	0.71	0.016	0.040	0.26

In considering the hardenability of steels which are coarse grained through method of deoxidation rather than heat treatment, it must be remembered that the "base hardness" chosen in this work is a function of composition alone. Changes in core hardness due to grain size are automatically taken

a series of carbon steels were heated to different temperatures in order to obtain variations in austenitic grain size, were then furnace cooled to 1500 deg. F., then water quenched and drawn for one hour at 500 deg. F. Separate samples of each steel were heated simultaneously and were air cooled,

rate was reached or exceeded during quenching.

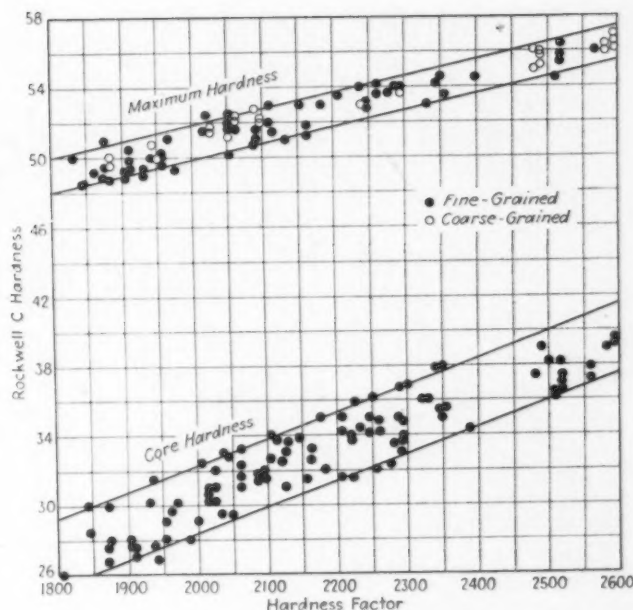
If the critical cooling rate is not reached, grain size becomes very important in determining surface hardness. The critical cooling rate for full hardness may not be reached due to—

- (a) Intentionally slower cooling rate.
- (b) The desired cooling rate is faster than the critical rate, but (1) gas films on the surface of the steel may retard the rate of heat transfer to such an extent that the critical cooling rate is not reached; and/or (2) if the scale does not break freely on quenching, the insulating effect of residual scale may act to retard the cooling rate.

No matter how the cooling rate is retarded the hardening reaction will behave in the same manner as just indicated for hardness penetration, i.e., will be a direct function of grain surface, and soft spots will occur where the critical cooling rate has not been reached. The hardness of the soft spots will depend on the analysis and grain size of the steel and on the effectiveness of the insulating spot of scale or gas.

The best method of avoiding soft spots is to be sure that the heating prior to quenching is carried out in such a manner that excessive scale formation is avoided, and to eliminate tenacious gas bubbles on the surface by proper agitation of the pieces or of the liquid quenching medium. In studying soft spots after quenching, a series of tests was made on fine-grained heats of S.A.E. 1045 steel in the form of 1-in. round bars, one set of bars heated in air, a duplicate set in a controlled neutral atmosphere. In the second or controlled atmosphere series, only a very light scale was formed on the pieces, whereas in the normally heated pieces the usual type of scale was present. Twenty Rockwell readings per in. of length were taken on each bar, and the percentage of soft spots as determined by these readings is as follows: oxidizing atmosphere—8.6 per cent of Rockwell readings showing soft spots, with a total number of readings of 3210; neutral atmosphere—0.97 per cent of Rockwell readings showing soft

FIG. 6—Effect of increasing hardness factor on the maximum hardness and core hardness of 1-in. round bars, quenched from 1550 deg. F. and drawn at 500 deg. F.



spots, with a total number of readings of 2585. The extreme importance of atmosphere control for reliable results in surface hardness can be seen from these data.

Experiments now in progress indicate that the type of steel may have a very definite effect upon the type of scale formed by a given atmosphere, thus affecting the manner in which the scale breaks away from the piece on quenching. This, therefore, affects the uniformity of surface hardness of the heat treated piece.

If the furnace atmosphere is oxidizing, or if the piece is improperly quenched, a coarse grained

steel, Type A, Fig. 2, is apt, because of a lower critical cooling rate, to give more uniform surface hardness than mixed and fine-grained steels, Types B, C, and D, Fig. 2, unless the latter are made in such a way that the scale has a tendency to break away cleanly from the metal surface during the quenching operation. If scaling can be closely controlled, the desired surface hardness can be obtained on steel of any grain size, provided that the critical cooling rate is exceeded in quenching. Under these conditions a fine grained steel, a mixed grain steel, or a coarse

(CONTINUED ON PAGE 50)

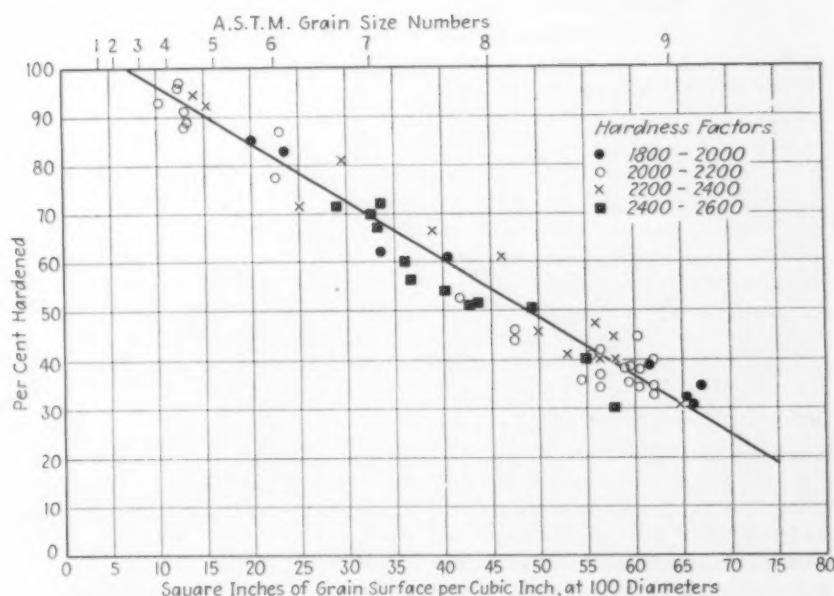


FIG. 7—Relationship between per cent hardened and square inches of grain surface. The straight line relationship shows definitely that hardness penetration is a function of grain surface alone.

How Arc Welding Cuts Costs Of Jigs and Fixtures

Part III—Simplified Tooling Procedure

By A. F. DAVIS

Vice-President, Lincoln Electric Co.,
Cleveland

STEPS in the weld fabrication of jigs and fixtures, and the personnel and equipment required are outlined in this concluding part of Mr. Davis' article. Advantages of arc weld fabrication and typical tooling savings were discussed in the first and second parts, in *THE IRON AGE* of Oct. 8 and Nov. 19, 1936, respectively.



TOOLING procedure with arc welding strikes a new note in simplicity. With arc welding, the toolbuilder merely cuts, fits and welds standard steel shapes, available from any mill or warehouse on short notice.

The steps in modern tooling procedure include laying out the design, cutting parts to size and preparing them for assembly, tack welding the parts together, inspecting the assembly for alignment and accuracy, and finish-welding all joints and seams.

The personnel needed for carrying out these operations varies according to the size of the plant and extent of the tooling requirements. Unless the number of tools, or the amount of tool work required regularly is very limited, the toolroom staff would consist of a foreman, draftsman, cutter, fitter,

welder and, in some instances, a machinist. In smaller plants the department might have only a foreman and a welding operator, the latter serving also as cutter and fitter. In this case the main drafting department would handle the toolroom's drawing requirements, and machining, whenever required, would be done in the plant machine shop.

The technique of welded tool production operates smoothly. As soon as a given jig or fixture is designed and detailed, the foreman of the toolroom receives the drawing. The foreman then orders the necessary raw materials. The required parts are cut to size, with a cutting torch or saw. All the individual parts of the unit are placed in a suitable container and delivered with the drawing to the

proper location where they are fitted together, tack welded, then finish welded.

The above procedure leads to prompt, efficient production of jigs and fixtures. In plants maintaining a night toolroom shift, a rush jig or fixture designed during the day and turned over to the toolroom, is cut, welded and ready the next morning.

Time Saved by Weld Fabrication

Both time and money were saved in arc weld fabricating the tooling shown in the accompanying illustrations.

The die shoe in Fig. 8, made by a large tractor company entirely by arc welding, is 33½ in. wide and 52½ in. long. The base is built of 2-in. boiler plate to which are

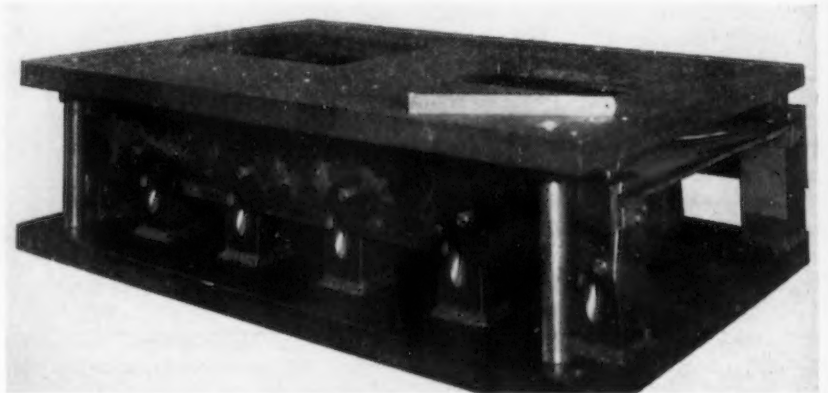


FIG. 8—Welded steel die shoe measuring 33½x52½ in., used at a large tractor plant in punching 12¾x1-in. holes in ½-in. stock. The base is made of 2-in. boiler plate.

welded on each side six $3\frac{1}{2}$ x $3\frac{1}{2}$ x 7-in. die posts. The bottom edges of the die posts were vee'd out before welding. The die plate itself is bolted to the top of the die posts to permit removing the plate for machining or inserting new bushings. Weight of the die and shoe together is approximately 3000 lb.

This production tool is used in punching $12\frac{3}{4}$ x 1-in. elongated holes in $\frac{1}{2}$ -in. stock. The parts punched weigh approximately 300 lb. each.

The jig pictured in Fig. 9, was made by a large manufacturer of woodworking machinery to facilitate machining to close tolerances. It is built entirely of mild steel, and is typical of many such units made by arc welding, with marked savings in time and money.

Fig. 10 shows a jig built entirely of steel plate, arc welded and used in punch press or architectural shear for special straightening work. The two large pieces of plate are reinforced by smaller

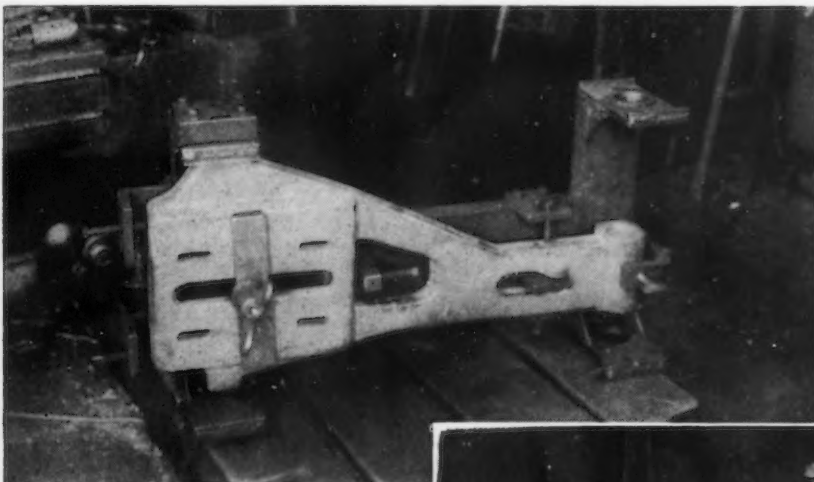
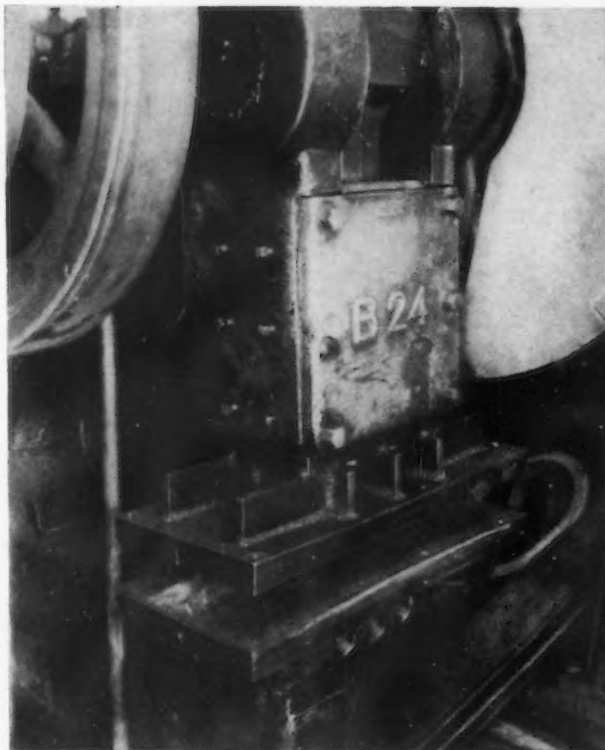
AT RIGHT

FIG. 10—Special straightening jig built entirely of steel plate for use in a punch press.

o o o

BELOW

FIG. 9—Weld fabricated jig employed to facilitate close tolerance machining of woodworking machines. (Photo by courtesy Jones-Superior Machine Co.)



pieces as shown. In this case arc weld fabrication cut the cost by more than half and saved many days by eliminating patterns.

Fixtures built of scrap materials furnish excellent examples of the savings available with arc welding. Those pictured in Fig. 11, used by a large motor manufacturer, were produced in a few hours by welding together scrap pieces of angles, plate, tubing and bar stock. Material costs were nil. Strength, rigidity and accuracy are entirely adequate.

The trunnion jig shown in Fig. 12 (the large unit at the top of the photo) was built by arc welding at a cost of only \$32.30, in-

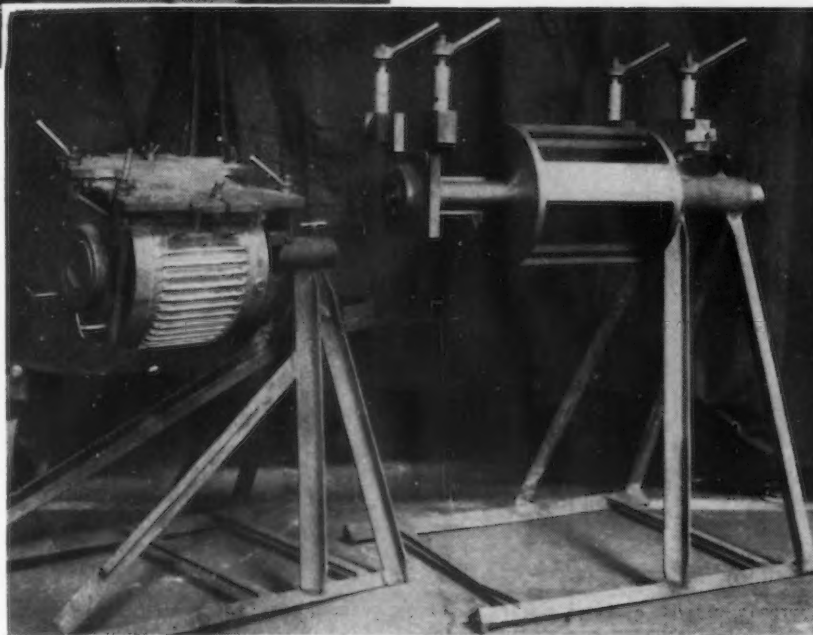
cluding material and labor. The three other units pictured with the trunnion fixture were produced by welding at a proportionately economical cost.

The first essential in the way of
(CONTINUED ON PAGE 51)

o o o

BELOW

FIG. 11—Fixtures produced in a few hours by welding together scrap pieces of plate, angles, tubing and bar stock.



The Stake of the Public Utilities in

THE electrical energy consumption of American industry as a whole is in the neighborhood of 90 billion kilowatt hours per year. Today, according to the Federal Power Commission, "The public utilities supply to the manufacturers of the country almost 55 per cent of the energy consumed in their productive processes, and more than 63 per cent of mining and quarrying power requirements." Hence the utilities have a

considerable stake in the questions of how power is applied to drive the machines of industry. At first blush it would seem that the utilities would be glad to see inefficient drive methods perpetuated in the manufacturing plants to which they sell energy, since such methods would tend to boost the sales of electricity, and hence increase the income of the utilities. But the opposite is true. Today the utilities all over the country are bending

every effort to show their industrial customers how to use power more effectively, even though in doing so the sales of energy may be, and frequently are, decreased.

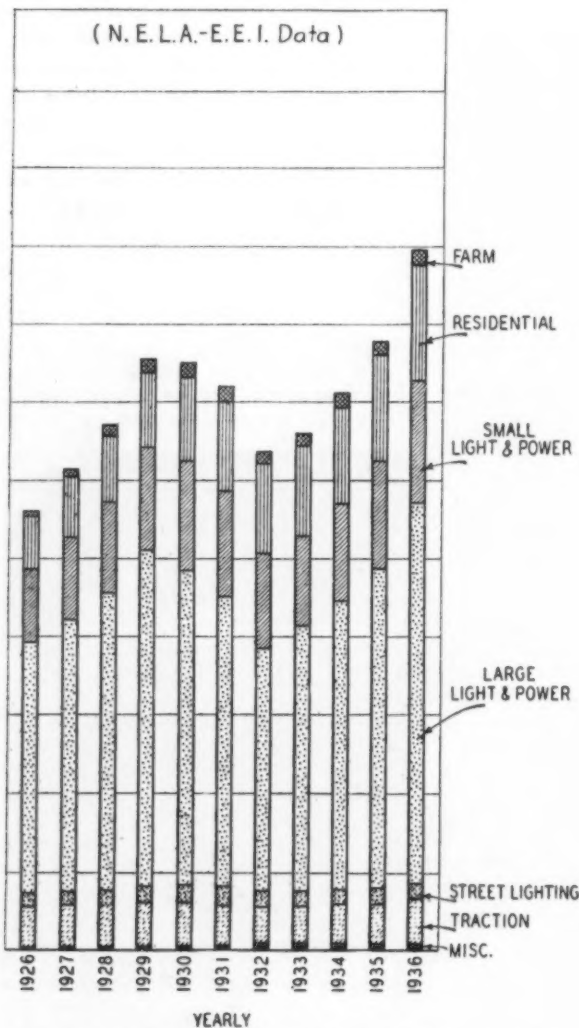
Why this idealistic attitude on the part of the public utilities? Analysis brings to light two essential facts which show that this "idealistic" attitude is very sound and practical. In the first place, the utilities have practically no excess capacity today, and hence must do everything they can to make the present capacity stretch to cover all reasonable demands, lest a definite shortage occur which would do more to stop the progress of industrial recovery than strikes or floods. And in

the second place, it has been definitely proved that the more efficiently industrial customers use the energy sold to them by the utilities, the greater is the *net* revenue obtained by the utilities. Here is a case where both parties profit; the customers' bills are less, and the utilities net revenues are more. This seeming paradox demands explanation. But before the explanation is given, it will be of interest to examine some pertinent facts bearing on the situation as a whole.

An Electrical Famine

In the issues of *THE IRON AGE* dated Oct. 5, 12 and 19, 1933, the writer published a series of articles entitled "An Electric Power Famine Approaches." Even in the early fall of 1933 it was clearly apparent that the consumption of electrical energy in the United States was outstripping the growth of generating capacity. The three and a half years which have elapsed since then have simply made the situation more serious. *Electrical World* in its statistical issue of Jan. 2, 1937, writes, "From a peak in 1929 industrial production, according to the compilations of the Cleveland Trust Company, fell off 45 per cent to a low in 1932, and in 1936 was still 13 per cent below the top. Industrial energy consumption, on the other hand, dropped only 30 per cent from the peak, and in 1936 exceeded the 1929 high by nearly 11 per cent." In other words, advancement in the form of new and improved electrical applications, plus the increasing mechanization of industrial processes, has swung the use of electrical energy 24 per cent ahead of industrial recovery as a whole.

Considering for the moment the question of the total use of the electrical energy generated by the privately owned public utilities of the country (that is, the combined uses represented by industrial, com-



Growth of all classes of electrical energy consumption.
(From Edison Institute, Statistical Bulletin, No. 4.)

Better Drive Methods

By FRANCIS JURASCHEK
Consulting Editor, *The Iron Age*

mercial, domestic, railroad and municipal customers), the startling conclusion appears that, since 1928, the generating capacity of these utilities has had a net increase of only slightly more than 20 per cent, while the output has increased by 28 per cent. Output has thus increased about 6 per cent more than generating capacity. To take care of the increased demand, the available capacity all over the country must work harder than in 1928.

Now, in these days of increasingly efficient central station operation, to work capacity 6 per cent harder does not seem to be out of the way. Let us analyze just what this actually means, however, by comparing the figures for the last previous peak year (1929) with the figures for 1936. In 1929, with 29.6 million kilowatts of generating capacity operating, 90 billion kw. hr. of electrical energy were produced. If every kilowatt of capacity had been in operation every hour of the entire year (there are 8760 hr. to the year) it would have been possible theoretically to produce 259 billion kw. hr. The "use factor" of the capacity, then, was 34.7 per cent in 1929.

In 1936, with 33.9 million kw. of generating capacity operating, 106 billion kw. hr. of electrical energy were produced. The theoretical possibility of production of 297 billion kw. hr.; giving a use factor of 35.7 per cent. This difference of one full point in use factor indicates an increase of about 3 per cent between 1929 and 1936.

But such a comparison is purely theoretical, since no central station is ever worked to full capacity 24 hr. a day, 365 days a year. Electricity is not like water. It cannot be pumped into a reservoir in times of low demand, and the reservoir excess released in times of high demand to aid the generators in meeting the full load. Electricity can only be manufactured in quan-

tities to meet the instant demand. Every kilowatt of energy generated must be put on the lines at once and consumed then and there. This means that a central station serving an industrial community must have a total generating capacity of about three times what is called for as an average all-the-year around "use factor" to meet the demands satisfactorily. This is not true, of course, of central stations serving strictly residential areas or farm sections—but we are concerned here with industrial power.

A 3300 Hour Year

Operating records of central stations serving manufacturing communities will show some such picture as this: 80 per cent of the total energy output for the year will be demanded during a 12-hr. period each day, during only those days on which manufacturing plants are operating. Counting out holidays, Sundays, and allowing a half-day on Saturdays (although in a majority of cases the Saturday half-day is no longer being worked, the total of "working" hours per year comes to but 8760.

Taking all in-

dustrial sales of power during 1936 as accounting for one-half of the entire output of the utility central stations, and assuming, likewise, that one-half the available generating capacity is utilized to meet this industrial demand, we get this situation:

Fifty-three billion kw. hrs. were produced during 1936 by 16.9 million kw. of capacity. Eighty per cent of this energy, or 42.4 billion kw. hrs., were demanded during 3300 hr. of the year. In these hours the theoretically possible output was 55.8 billion kw. hr.; consequently the use factor for industrial energy production alone must have been 95 per cent!

This figure, however, does not express the final relation between capacity and output, since no account has been taken in it of peak loads. Only the average load over the 12 working hours per day, during which 80 per cent of the entire

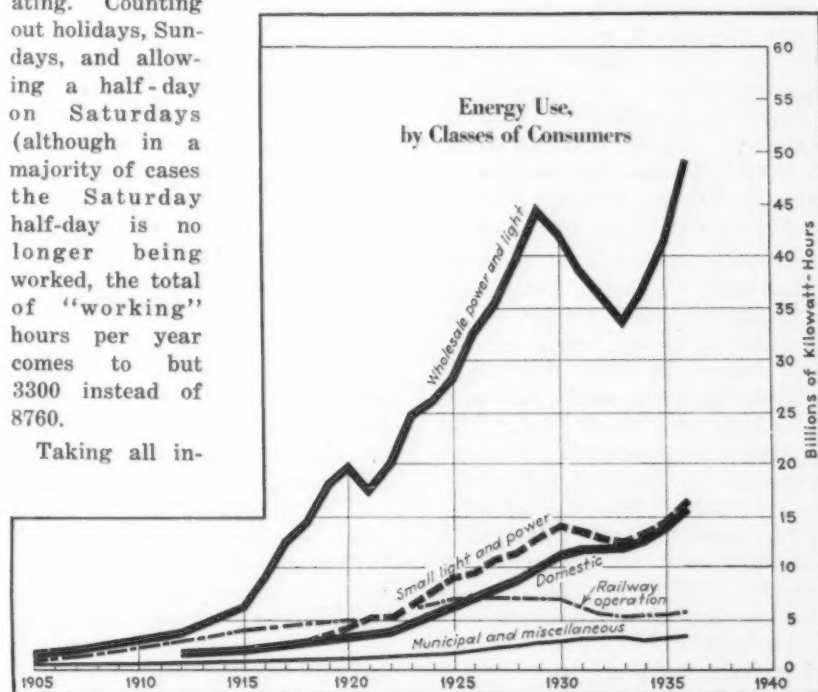


Chart by Courtesy of Electrical World, Jan. 2, 1937.

day's load is demanded, has been considered. But every day peak demands occur. For instance, at the hours of starting up machinery in the morning and after lunch, and late in the afternoon of dark days when a heavy lighting load is added to the industrial load, high peak demands must be considered. These peaks require, at the most conservative estimate, 5 per cent additional capacity in the generating stations.

The obvious conclusion, then, is that, considering the manufacturing communities of the country alone, there is today no excess generating capacity available in the privately owned central stations.

Power Consumption Fluctuations

Table 1, deduced from the reports of the Edison Electrical Institute, shows comparisons for the nine power districts of the United States of generating capacity, energy output, and the theoretical "use factor" based on 8760 hr. per year, from the pre-depression peaks of 1929 to the present peaks of today. The only figures open to question in this table are those showing energy consumption in the nine districts during 1936. The total for the year is an estimate of the Edison Electrical Institute; the district figures were estimated by the writer from 10 months' reports of the Federal Power Commission, adapted to correspond with the means of tabulation used by the Edison Electrical Institute for all the rest of the statistics. Percentage figures show the net change in energy consumption by districts from year to year. It is interesting to read from these figures how depression hit the different sections of the country at different times.

It may seem idle to prophesy what 1937 will bring forth. But, considering that 65 per cent of the increase in energy consumed during 1936 over 1935 was represented by increased industrial demands, and that, while the increase in industrial consumption rose for the year as a whole by 19 per cent, the fall and early winter months showed a gain of 25 per cent over the corresponding months of 1935, it seems fair to assume that, should industry continue to expand at its present rate throughout this year, the industrial demand for utility energy during 1937 will be approximately 60 bil-

lion kw. hr., conservatively estimated.

Can This Demand Be Met?

Can the utilities meet this enormous demand? We have heard a great deal lately about obsolescence in industry. The utilities, despite a record of efficiency which includes such progress as the present manufacture of a kilowatt of electricity from 1.47 lb. of coal where in 1920 3 lb. of coal were required, are no exceptions. Since 1928 less than seven million net kilowatts of additional generating capacity have been placed in service. The average age of all generating equipment now in use in the privately owned central stations of the country is over 15 years. (The record is even worse in the municipal stations.) Manifestly old equipment cannot be safely forced to a duty running almost 100 per cent of capacity, day after day. As a matter of fact, quite a bit of old equipment, kept merely for stand-by use, has been pressed into continuous service to help carry today's loads, and some old stations, closed down when newer and more efficient ones were built, have been opened again. Finally, hundreds of stations have been interconnected by high-power transmission lines with other stations to more effectively carry the peak loads through power transfers.

Quoting *Electrical World* again (Jan. 2, 1937), "The 1936 industrial sales curves disregarded the usual characteristics of coming to a peak in the late summer and then tapering off for the balance of the year. Instead, from February on, each month has shown a larger volume than the previous month. The effect has been to establish new peaks, and a decreasing margin between capacity and demand. That this situation must be translated into plant expansion is obvious."

The net increase in generating capacity in 1936 for all utility plants (both privately and publicly owned) was reported by the Federal Power Commission as 606,908 kw. As shown in Table 1, the increase reported by Edison Electric Institute up to Oct. 31, 1936, for the year was only 3055 kw. *Electrical World*, however, reports that additional net capacity placed in operation during 1936 by the privately owned utilities amounted to 131,113 kw., leaving 475,795 kw. net

additional capacity for Federal and municipal plants, of which the Federal project at Norris Dam (TVA) was the largest single increment (100,000 kw.).

There is scheduled for 1937 a total of 1,272,930 kw. additional capacity, of which 826,780 kw. is private, and 446,150 kw. is Federal and municipal. The privately owned capacity, considering the fact that it will be put into operation at different times during the year, and that not all of it will serve industrial communities, may be counted upon to produce about two billion kw. hr. of industrial energy at the most. Municipal construction cannot, of course, be counted upon to relieve the industrial demand (with the possible exception of the new 165,000 kw. in generators at Boulder Dam to serve Los Angeles), and the only Federal capacity scheduled to be added is Bonneville, in the Pacific Northwest, 86,400 kw.

Three Points at Issue

Three points to be examined in relation to the question, "Where will the power come from?" are (1) Federal projects, (2) Interconnections permitting energy transfers, and (3) The purchase of power by the central stations.

Federal projects have so far had but small influence on the question. In the TVA area, Wilson Dam and Norris Dam have made but 290,000 kw. available; Wheeler and Pickwick Landing (both still two years or more ahead) will add only 135,000 kw. together. Bonneville will add 86,400 kw. in a region that is not industrial. The Boulder Dam and Grand Coulee projects will eventually add about 220,000 kw. more in the Mountain and Pacific Coast districts. In brief, there is little relief to be looked for in Federal projects.

Interconnection has proceeded at a fairly rapid pace. A recent publication of the Federal Power Commission shows that 57 principal systems of utility companies, with 50 additional minor systems and eight large municipal stations now serve over three-fourths the habitable area of the United States, control over 92 per cent of the generating capacity of all privately owned central stations, and sell over 90 per cent of the energy purchased. Over 200,000 circuit miles of transmission lines of 11,000 volts or over carry energy from the vari-

ous generating stations to the load centers for distribution, or to interconnect systems with each other.

About one-half the total generating capacity is controlled by the nine largest systems, as follows:

System	Per Cent Total Gen. Cap. Controlled
Electric Bond & Share group (including American Gas & Electric Co., American Power & Light Co., Electric Power & Light Corp., and National Power & Light Co.).....	11.5
Consolidated Edison Co. of N. Y.	6.8
Commonwealth & Southern Corp.	6.3
North American Co.....	6.1
Niagara-Hudson Power Corp...	4.5
Standard Power & Light Corp..	4.5
Pacific Gas & Electric Co.....	3.6
United Gas Improvement Co....	3.6
Associated Gas & Electric Sys- tem	2.8
	49.7

Another 38 per cent of the total generating capacity is controlled by 48 other large systems, about 2½ per cent is controlled by 50 additional minor systems and eight large municipal plants, and less than 10 per cent is in the hands of

some 3443 independent municipal and private utilities.

In the 57 major systems there are three types: 1, Those systems which have no subsidiaries, and are directly engaged in furnishing electric service; such as Edison Electric Illuminating Co. of Boston, and Southern California Edison Co. 2, Those systems which furnish electric service both directly and through controlled subsidiaries; such as Commonwealth Edison Co. (Chicago), Detroit Edison Co. and Pacific Gas & Electric Company. 3, Those systems engaged in electric utility service indirectly by having a controlling interest in operating utilities; such as Commonwealth & Southern Corp., Columbia Gas & Electric Corp. and Standard Power & Light Corp.

The significance of these groupings lies in the fact that for the most part the utilities in group 1 are essentially self-contained, with practically no interconnections with other systems. Interconnections can, however, be readily made. In group 2 the interconnection prin-

ciple within the system is already well established, and frequently also to other systems outside. Extensions can be readily established. In group 3 the operating utilities of each system often are totally unrelated to each other from the standpoint of territories served; hence interconnections within the system are not many. But interconnections with other systems are made, and additional ones can be readily effected.

In general (a complete analysis of this phase of the subject would require a voluminous report in itself) it may be stated that practically all industrial areas are well served today by interconnected utility systems, or in case of need could readily be included within an interconnecting network for the purpose of balancing peak demands. In the year 1935 a grand total of 35 billion kw. hr. of energy was transferred from station to station before sale to the consumers, over these interconnecting networks—more than one-third of the total output of the entire country. The

(CONTINUED ON PAGE 82)

TABLE 1

	1936			1935			Per Cent Change in Energy Consumption from Year to Year						1929		
	Gen- erat- ing Ca- pacity 000 Kw.	Energy Con- sump- tion 000,000 Kwhr.	Use Fac- tor, Per Cent	Gen- erat- ing Ca- pacity 000 Kw.	Energy Con- sump- tion 000,000 Kwhr.	Use Fac- tor, Per Cent							Gen- erat- ing Ca- pacity 000 Kw.	Energy Con- sump- tion 000,000 Kwhr.	Use Fac- tor, Per Cent
							'34 '35	'33 '34	'32 '33	'31 '32	'30 '31	'29 '30			
New England	2,561	7,300	32.8	2,568	6,302	28.0	+ 9.0	+ 4.7	+ 7.5	-10.1	+ 5.8	- 2.9	2,286	5,857	28.4
(Me., N. H., Vt., Mass., R. I., Conn.)															
Mid-Atlantic	3,416	26,500	35.9	3,459	23,167	31.3	+ 6.6	+ 7.4	+ 1.2	- 9.2	- 1.1	+ 1.9	6,984	21,746	35.8
(N. Y., N. J., Pa.)															
East North Central...	7,888	25,700	36.9	7,818	22,350	32.9	+ 8.7	+11.4	+ 3.7	-16.8	- 6.5	- 5.4	7,438	22,847	35.0
(O., Ind., Ill., Mich., Wis.)															
West North Central...	2,573	6,500	34.7	2,575	6,334	31.0	+14.6	+ 3.7	+ 2.6	- 6.1	- 8.2	+ 6.5	2,076	5,387	29.4
(Minn., Ia., Mo., N. D., S. D., Neb., Kan.)															
South Atlantic	3,902	12,400	35.4	3,987	10,408	29.7	+12.3	+ 0.2	+ 3.3	- 3.5	- 4.1	- 7.7	3,520	10,378	27.2
(Del., Md., D. C., Va., W. Va., N. C., S. C., Ga., Fla.)															
East South Central...	1,642	4,500	31.2	1,591	3,837	27.4	+11.7	+22.1	+ 7.8	-19.3	- 3.3	- 1.5	1,350	3,397	28.7
(Ky., Tenn., Ala., Miss.)															
West South Central...	1,717	5,000	33.0	1,734	4,669	30.7	+ 5.9	+ 6.5	+ 1.0	- 8.4	-11.7	+ 3.3	1,422	4,888	39.0
(Ark., La., Okla., Tex.)															
Mountain	1,151	3,500	34.7	1,142	3,331	33.3	+21.3	+ 5.8	+10.4	-22.3	-12.4	- 7.7	1,043	3,786	41.2
(Mont., Ida., Wyo., Colo., N. M., Ariz., Utah, Nev.)															
Pacific	3,951	14,600	42.2	4,014	12,213	34.8	+ 6.0	+ 9.5	+ 0.6	-13.4	+ 1.1	+ 1.0	3,489	11,798	30.3
(Wash., Ore., Cal.)															
Totals	33,891*	106,000*	35.7	33,888	92,611	31.0	+ 9.0	+ 7.6	+ 2.9	-10.4	- 3.4	- 1.6	29,558	90,084	34.7

*Estimated by Edison Electrical Institute on basis of returns to Oct. 31, 1936.

MANY a machine tool builder took advantage of the lean years to redesign his line completely. As a result the machines coming out of the machinery shops are so different in appearance that one can easily distinguish them from the pre-depression models by their styling, even though no inquiry be made into the speeds and feeds possible. Machine tools have gone modern, but in a stern, aesthetic sense. Two trends have found their expression in a single medium—predominance of simple, straight-line forms in art arrived at a time when the welding of rolled plates

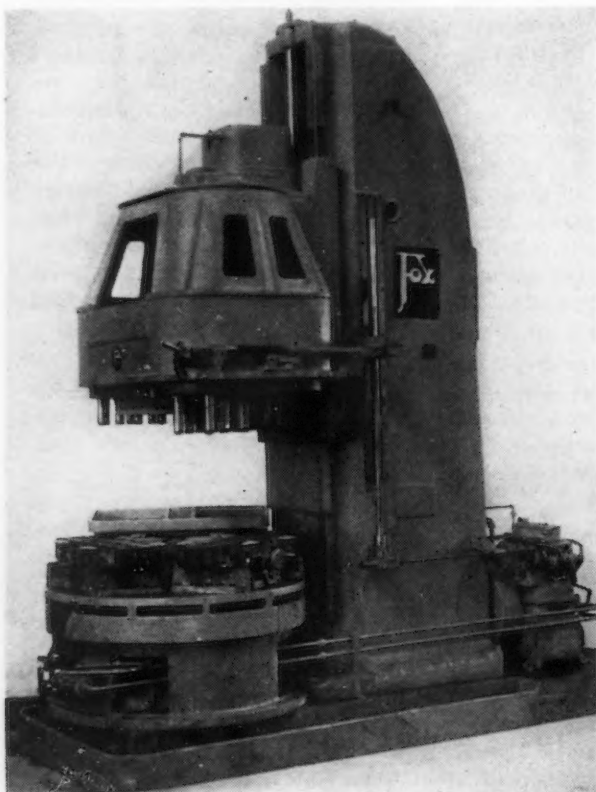
Fox Machine Goes Modern

as the circular dog plate, an unusual construction. By means of these dogs, the point at which rapid traverse, feed and rapid reverse takes place can be set, but not the rate, which is controlled separately

at the Oilgear pump. The control dial is connected mechanically with the pump valve.

An electrical arrangement is also available through limit switches located on the column in a concealed position and actuated by dogs on the head. This type of control is available with either Oilgear or Vickers hydraulic equipment. The older machine carries a cam plate on the side, fully exposed to view.

Welded construction obviously cannot be carried throughout. The column way is cast iron and is doweled and bolted to the steel columns. The head includes a slide surface of cast iron. The table and fixture is welded, however, since each fixture must be designed for a specific job, making pattern charges prohibitive. In the unit pictured, indexing is manual, but



AT LEFT
OUT of date. This multiple Fox drill has cast iron base, column, head and table. In the modern version unsightly controls are concealed.

BELOW
THE modern structure. Trim is cadmium plated steel, sheathing is No. 10 gage steel covering hydraulic piping. Ways are cast iron bolted to welded steel columns. The head has a cast iron slide.

and shapes to form machine units was becoming extensive. One of the builders who has adopted this trend is the Fox Machine Co. of Jackson, Mich. A striking comparison can be seen in the illustrations of two equivalent machines of post- and pre-depression vintage.

In the modern version, the vertical column has a backbone formed of two composite welded steel members, but these as well as all the hydraulic piping and other controls are concealed behind the set-back sheathing. This covering plate is No. 10 gage steel trimmed with cadmium plated strip of the same thickness. Smartness is added by flush mounting of the pressure gage dial and the circular instruction plates and valves beside it, as well



with Welded Structures

prior elevation of the table on a single ball is accomplished hydraulically. Starting the cycle is effected by a treadle with a hand lever for inching.

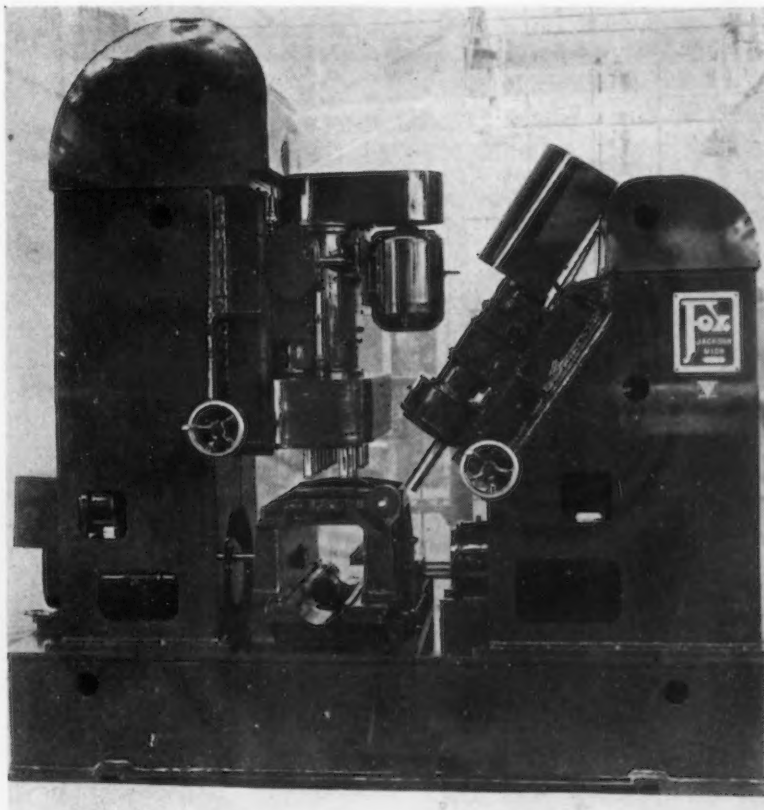
For balance and better accessibil-

heads can be either cam-fed or hydraulically fed, both completely self-contained and with standard driving motors.

The switch from castings to welded steel has been carried throughout

the Fox line, which includes both vertical, horizontal and angular drilling units, as well as assembling and straightening presses and push broach presses. In fact, welded steel lends itself to custom built equipment at relatively low prices, so that all special-purpose equipment is being fabricated that way.

During the prosperous twenties the Fox Machine Co. operated its own foundry. With drastic curtailment of volume during the early thirties, the foundry was shut down and all castings jobbed out, although the firm continued to operate its pattern shop. Now, the foundry has been converted into a weldery. Not all the equipment has been moved out. The original crane facilities are there, and a battery of oil-fired pots has been retained to make small non-ferrous castings. One gray iron cupola is still there, though not in operation. The same sand blasting equipment available for castings serves the welded structures in cleaning of scale and preparing the surfaces for painting. One annealing furnace has been installed and a second is being built to accommodate large size bases.

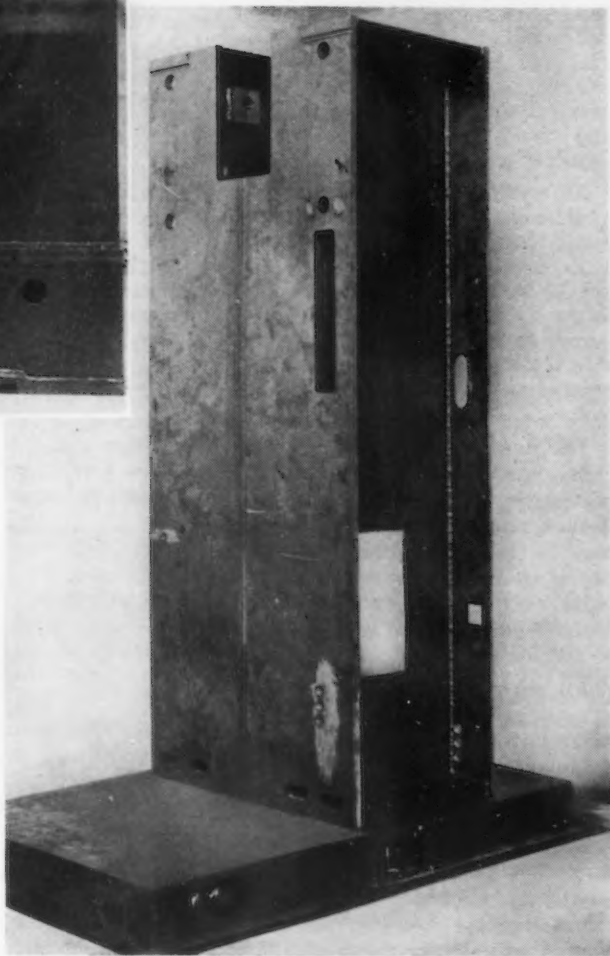


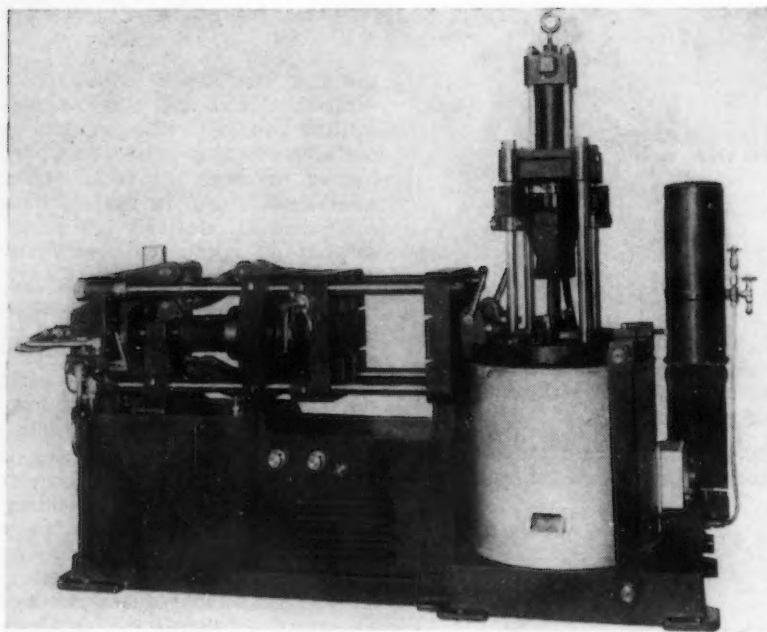
ity there are two hydraulic cylinders on either side of the column instead of a single cylinder within the column. The new arrangement also provides more space for counterweights.

Cast iron ways are only used where there is sliding action. When unit heads are simply located in a fixed position on a base or column, the steel plate is scraped to give a good bearing. The unit type of construction, illustrated, lends itself to special-purpose machinery in which the specialties are found in the welded bases. On the other hand, with quantity production available, the housings and frames of the unit heads are more economically made in cast iron. The unit

ABOVE
WE L D E D construction lends itself to special machines which may be designed for only one customer's particular requirements. Fixture, base and columns are made from rolled steel. The unit cam-feed heads have cast iron housings.

o o o
AT RIGHT
COLUMN and base of vertical drilling machine made of rolled plate arc welded. A pair of standard I-beams are sometimes employed for the columns.





Hydraulically-Operated Die Casting Machine

FOR casting zinc or white metals the hydraulic die casting machine illustrated has been brought out by the Phoenix Ice Machine Co., 2711 Church Avenue, Cleveland. It was designed by the Lester Engineering Co. of the same address and is designated as the H-HP-2 Lester machine.

All moving parts are operated by a self-contained hydraulic unit. The die is locked and opened by toggle links that are actuated by a hydraulic cylinder directly connected to the links which in turn are connected to a stationary and a movable plate. This construction, it is pointed out, assures a positive die lock.

The bars at the top of the machine are removable. The die plates are provided with standard T-slots, and dies of irregular shape may be set in the machine. In changing dies the die space may be quickly adjusted to fit the new die without possibility of misalignment of the die plates.

All parts employed in the cycle of operations are automatically controlled and are easily adjusted by finger tip controls, the flexibility of these controls permitting quick adjustment of the dies and changes in operating speeds. The length of time that pressure is maintained on the molten metal and the time for cooling the metal in the die is closely adjustable, these two ad-

justments being independent of each other.

The metal plunger is operated directly by a hydraulic cylinder that is designed to give a self adjustable and rapid injection stroke. This cylinder, it is stated, provides a positive pressure and insures solid castings with good surface finish. There is also provision for adjusting the velocity of injection. The method of operating the plunger, it is claimed, permits the production of castings varying in shape, weight and wall thickness.

The metal plunger is of the solid type and the gooseneck bushing in which it operates is removable. The gooseneck is cast integral with the melting pot. Positive high pressures permit casting operations at minimum temperatures.

The hydraulic ejector is designed to function with any die that can be placed within the die opening. Castings cannot be ejected until the dies have been opened. The full opening motion of the die can therefore be utilized for pulling cores.

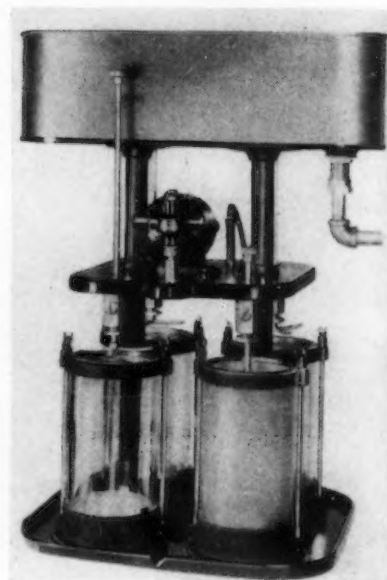
The furnace is an independent unit and is removable. Heat of the metal is controlled by pyrometer, thermocouple and thermostat. A motor-driven blower with an automatic gas and proportioning valve, mixer and burner operates in connection with a thermostat which is controlled by the thermocouple in the molten metal.

Principal dimensions are: Die opening $7\frac{1}{2}$ in., die height $6\frac{1}{4}$ to 14 in., clearance between bars 12 x 14 in., metal pot capacity (zinc) 350 lb., plunger capacity (zinc) 4 to 5 lb., locking pressure on die 70 ton, approximate weight of machine 6400 lb.

Washes Clay Out Of Molding Sand

A MACHINE for automatically washing the clay out of molding sand has been placed on the market by the Harry W. Dietert Co., 9330 Roselawn Avenue, Detroit. It enables foundries and sand producers to obtain the percentage of AFA clay substance contained in molding sands and thereby check specifications and maintain standards.

Four wash bottles are provided, so that four samples may be washed at one time. Water from a constant level tank is piped to stirring tubes



which are rotated and immersed in the sand sample. The water carrying the clay substance flows over the top of the wash bottles and drains out of the base of the machine. The rate of flow is governed so that the water will carry out of the wash bottles only sand particles 20 microns and smaller. A thermostatic heater is mounted in the water tank to maintain a constant temperature of 75 deg. F.

The wash bottles have removable bottoms so that clay-free sand grains may be removed from them without filtering and dried directly in an oven. The washing tubes are motor-driven. The net weight of the unit is 70 lb.



Flame Hardens Man-Ten Steel

FLAME-HARDENING the surface of one flange of a 16-in. Carnegie H-beam of Man-Ten steel (0.35 to 0.39 per cent carbon) in a Cleveland fabricating plant is shown in the accompanying illustration. The hardened flanges of this and a companion beam serve as runways for the supporting rollers of a movable gear reduction unit that imposes a maximum wheel load of 38,000 lb.

The beam is 254 in. long and the track hardened is about 4 in. wide. Hardness of 450 to 500 Brinell to a depth of not less than $\frac{3}{32}$ in., over a total area of nearly 1000 sq. in. was required. The torch tip, 2

in. wide, made three overlapping passes over the area hardened, consuming approximately 375 cu. ft. of oxygen and 355 cu. ft. of acetylene per hour. The torch operated at a speed of 8 in. per min., and the heated area was immediately quenched with water sprays that followed the flames. Two more beams were hardened later, making a total of approximately 4000 sq. in. of the Man-Ten steel that was flame hardened.

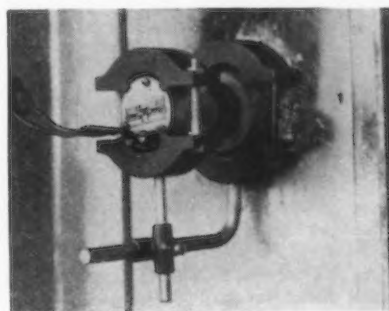
Equipment made by the Air Reduction Sales Co., New York, which furnished the above data and illustration, was used in this work.

Temperature Detector Mounts Outside Of Furnace

MAINTENANCE of thermocouples exposed to high temperatures, contaminating gases and severe vibration is said to be markedly reduced by the Rayotube, a new device offered by the Leeds & Northrup Co., 4934 Stenton Avenue, Philadelphia. The device not only continuously detects the temperature of forge, slab, billet and heat-treat furnaces, but in heat-treating shops it may be used for detecting the temperature of the work itself as it drops off a conveyor into the quench.

The Rayotube is mounted in a "cool" place just outside of the furnace, as shown. It sights into a simple target tube, the closed or "target" end of which projects into the furnace and is always at furnace temperature, to which the

Rayotube outside instantly responds. The entire device is hermetically sealed against dust and



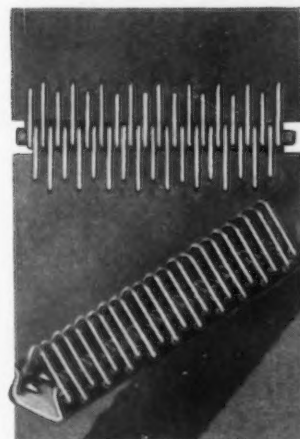
THE Rayotube temperature detector mounts on the outside, and sights through the open end to the target-end that projects inside the furnace.

gases to assure long-life calibration and sensitivity.

Two models of the Rayotube, namely a wide angle and a narrow angle type, for temperature detection of large and small areas, respectively, are available. They are used in connection with the company's standard Micromax Controllers, which can be equipped to automatically indicate and record, to operate signals, or to automatically regulate furnace temperatures.

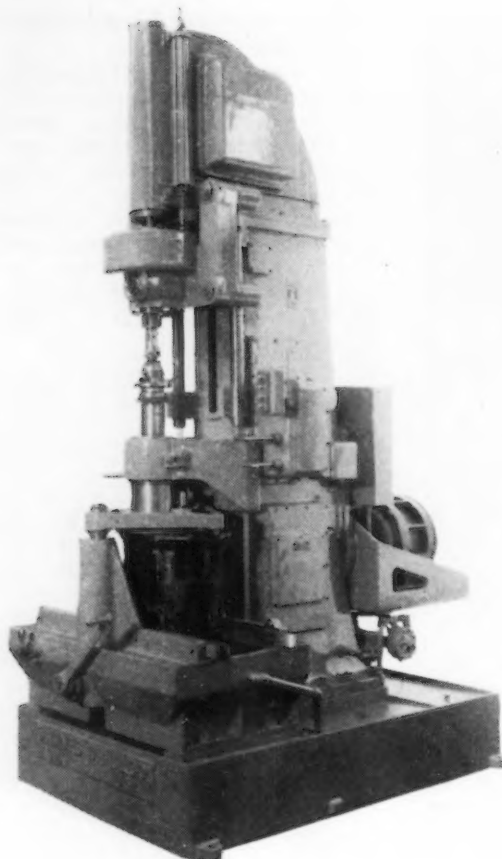
Carded Belt Hooks

BELT hooks mounted on special processed cards (patent applied for) that hold the hooks firmly in the card, strengthening them and permitting the workman to easily cut off the desired number of hooks without destroying or disturbing



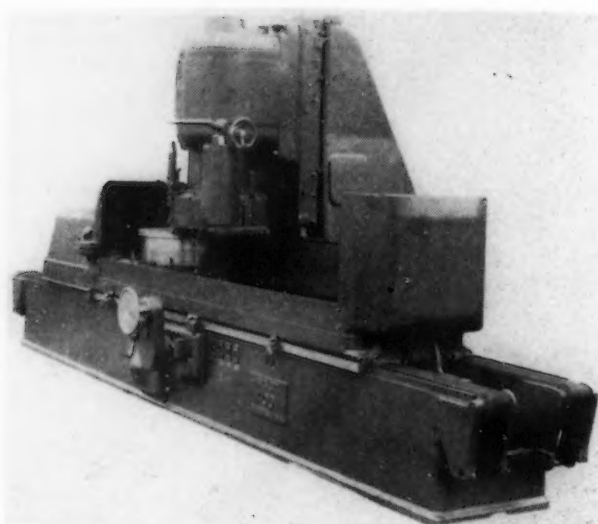
the others, have been brought out by Armstrong-Bray & Co., 308 North Sheldon Street, Chicago. These Wiregrip carded belt hooks are designed for hard, continuous use, and may be applied with any standard lacer or with a Wiregrip belt lacing machine.

A new engine, designed and built by a young English engineer, promises some remarkable developments in the internal combustion engine. A $2\frac{1}{2}$ -hp. engine propelled a motorcycle at a timed speed of 100 miles per hr. The maximum speed of the engine is 14,000 r.p.m. Traveling at speeds up to 80 miles per hr. on inexpensive gasoline, a motorcycle covered 150 miles to the gallon. *Industrial Britain*, which reported this new engine, states that there is almost a complete lack of carbon deposit. The inventor is now engaged in building a four-cylinder airplane engine for a well-known firm of airplane manufacturers.



Honing Machine Has Unitary Control

SELF-OILING honing machines designed with hydraulic variable-speed transmission are offered by the Barnes Drill Co., Rockford, Ill., in capacities of cylinders up to 10 in. in diameter, 26 in. swing, and 20 in. normal spindle travel. These machines have infinitely variable speed changes between 100 and 250 r.p.m., or any other similar ratio, and a tachometer is provided to show the exact speed in use. They may be equipped with hydraulic dwell for blind end cylinder honing and an electric stroke counter which predetermines the number of cycles of reciprocation and provides automatic lift out for the automatic hones. The spindle carriage is air counterbalanced. The "unitary" control lever used for the multiple-disk driving clutch simultaneously starts rotation and reciprocation of the tool. A latch on the lever permits reciprocating spindle without rotating, or rotation of the spindle without reciprocating at the will of the operator.



New Vertical-Spindle Surface Grinder

THE No. 400 series vertical-spindle surface grinder recently added to the line of the Hanchett Mfg. Co., Big Rapids, Mich., has a hydraulically-operated work table and is equipped with a 30-hp. 700-r.p.m. built-in type motor. It can also be furnished with a 40-hp. motor. The

grinding wheel, either of cylindrical or segmental type, is 22 in. in diameter, 4-in. high and has a 2-in. face. These machines are built in all lengths from 50 to 132 in. The T-slotted table top is 18 in. wide, and can be of any de-

sired length. Table speeds up to 90 ft. per min. are obtainable. The grinding wheel head is provided with hand, power and automatic feeds.

The 24-in. diameter rotating magnetic chuck shown at one end of the table of the machine illustrated is driven by a separate motor through a variable-speed unit. It may be easily removed and a rectangular chuck or fixtures applied in the usual manner. Equipment includes a wheel dressing device, a motor-driven coolant system with a coolant tank of unusual capacity, and patented belt covers for the table ways.

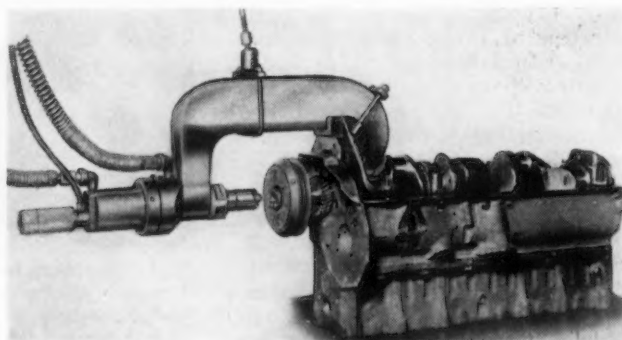
Portable Press for Mounting Timing Gears

FOR pressing timing gears and harmonic balancer units into position on automobile engine crankshafts, the Hannifin Mfg. Co., 621 South Kolmar Avenue, Chicago, has developed a new high-speed portable hydraulic press. A

locating fixture simplifies handling and assures correct alinement of the press with the work.

This yoke-type press, shown in the illustration, weighs approximately 80-lb. Hydraulic power is provided by the company's "Hy-

PRESSING a push button in the handle starts the automatic operating cycle of this portable unit for pressing timing gears and balancer units on to crankshafts.



Power" hydraulic pressure generator—a self-contained unit driven by a 2-hp. motor. High pressure hose and a control cable connect the generator and press. The operating cycle is completed automatically upon pressing a control push button in the handle which actuates the automatic electric valve unit.

The cycle includes: Rapid advance stroke at moderate pressure; high pressure for the pressing stroke; reversal at peak pressure; and rapid return to starting position. The pump idles at zero pressure between cycles. The complete operating cycle requires approximately 2 sec.

bushed, and either wedge adjustment or ball screw adjustment can be furnished. The machine has a normal stroke of 4 in. and a maximum stroke of 12 in. Twin spiral gears are used and the backgear shaft runs in Hyatt heavy-duty bearings. A twin disk clutch acts as the engaging means. Specifications include: Distance between pillars, 25 in.; bed area, 22 x 22 in.; speed of backgear shaft, 360 r.p.m. A 10-hp. driving motor is required. The weight of the press is 12 tons.

Hammer for Forming Airplane Sheathing

FOR rapid production of airplane wing and fuselage sheathing and of other airplane sheet metal parts, the Chambersburg Engineering Co., Chambersburg, Pa., has developed the pneumatic hammer illustrated, which operates from the normal shop supply of compressed air.

The machine is equipped with a smaller cylinder than usually fitted to a steam or air-operated hammer, and the ram is of light-weight, ribbed design. Ram weight may be adjusted or the general design modified to meet special requirements. The tool may be operated by the hand levers shown or by a conventional or special treadle placed so that the operator will have maximum visibility of the work and complete control of the ram movement. A feature of the machine is

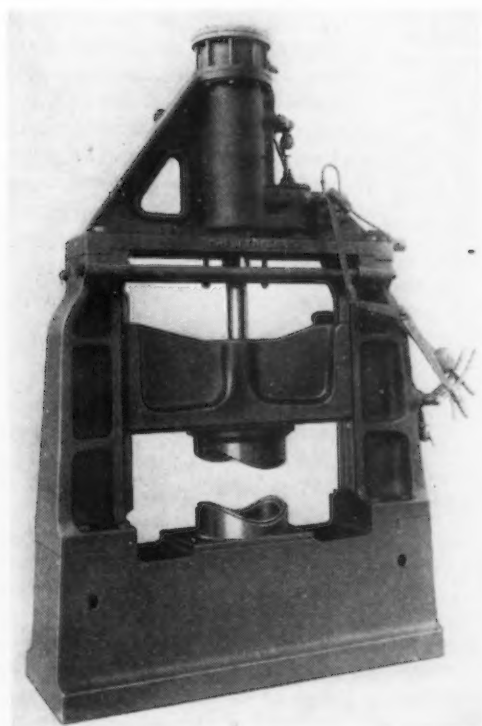
that the blow may be delivered and, if desired, the pressure maintained for any length of time with the ram or upper die in contact with the work.

200-Ton Straight-Sided Power Press

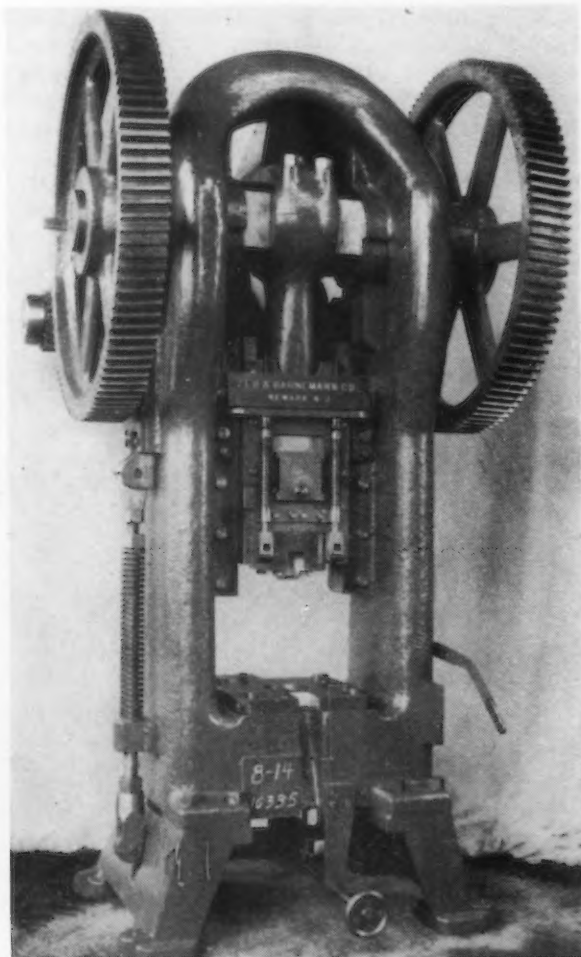
THE 200-ton capacity straight-sided power press here pictured is a recent addition to the line of the Zeh & Hahnemann Co., 182 Vanderpool Street, Newark, N. J. Frame and pitman are of solid steel castings, bearings are bronze

Drive Housing Weld Fabricated

WELDED steel construction was employed for the drive housing of a rotary splitter recently fabricated in the welding shop of the Bethlehem Steel Co., Bethlehem, Pa. The job called for plates ranging in thickness from $\frac{3}{4}$ in. to $1\frac{1}{2}$ in. Both plates and forgings were used for the bearing housings, and the total weight of the four sections, previous to machining, was 13,205 lb.



PNEUMATIC hammer for airplane sheet metal work. After the blow is delivered, pressure may be maintained for as long as necessary.



Buick Takes Another Forward Step in Forging Practice

(CONTINUED FROM PAGE 29)

ing twisted, it is a very symmetrical forging with the metal well distributed in the cheeks and integral counterweights.

It might appear that this hammer is oversize, since smaller hammers are working successfully on larger forgings, but the increased capacity provides for possible heavier work in years to come.

Dimensional and weight details of this 16,000-lb. hammer should be of interest, since it is the largest of its type in the world. Space between guides is 34 in. and the ram measures 44 in. front to back. Die notch in the sow block is 18 x 51 in. Top part of the anvil is an annealed steel casting 7 ft. 5 in. by 13 ft. 5½ in. at the base, by 8 ft. 8 in. deep. It weighs 249,600 lb. The lower portion is made of Cocalloy, a high strength nickel molybdenum air furnace iron, 45 in. deep and weighing 151,000 lb. Cylinder assembly weighs 17,000 lb. and the falling mass exclusive of die, is 16,400 lb. Altogether, the hammer weighs 525,000 lb. Aside from the impact of the falling weight, steam pressure of 120 lb. per sq. in. on the 25-in. diameter piston adds 59,000 lb. to the forging pressure. The piston, incidentally, is made of high-carbon steel 8 in. thick, with cold drawn steel rings. It is shrunk on a forged Heppenstall rod, 9 in. in diameter. Ram is forged S.A.E. 4140 steel. The cylinder is a steel casting lined with Cocalloy.

Overall height of the hammer is 30 ft. 5¼ in., of which 22 ft. 4½ in. is above the floor line. The anvil base measures 13 ft. 7 in. by 7 ft. and rests on a crib composed of four alternate layers of 12-in. timbers at right angles to each other, which tends to absorb the impact shock. These timbers in turn are set in a recess measuring 15 ft. 1 in. by 8 ft. 1 in. in a monolithic concrete block which rests upon hard blue clay without piles. The anvil base is also cast in concrete to the floor line, making the total depth of concrete 22 ft. 6 in. from the floor line.

Material for this light crankshaft is S.A.E. 1045 steel in the form of 4 in. square billets with rounded corners, 37 in. long and

weighing 167 lb. They are sheared from billet bars 15 ft. 5 in. long. Such material is just as satisfactory as bars and gets a lower freight rate classification.

Cycle on these crankshafts is as follows: heat in pusher-type furnace; roll and finish forge; trim flash in Toledo No. 59¼ press; upset flange in 4-in. Ajax forging machine; twist cranks to 90 deg. angle; load in tote baskets for heat treating.

The heating furnace is of Buick design and represents the culmination of all experience to date in building such units. It is roughly 40 ft. long by 7 ft. wide. It is fired by oil, with three burners in the soaking zone and two each along the side walls, as shown in the cross-sectional view. A heat interchanger is placed in the stack and serves to preheat the blast air to 600 deg. F. Soaking temperature is 1550 deg. A short piece of endless chain with dogs serves as a pusher outside the furnace proper. There are about 115-120 billets in the furnace at one time and they take about two hours to go through. In the heating zone the billets slide down a ledge onto a plastic bottom. This is composed of "Chromepatch" cement, about 5 in. thick. Every 24 hr., it is patched and renewed. At the same time the forging dies are cleaned and polished and other machinery cleaned up. The forge shop operates on two 9-hr. shifts.

This plastic bottom is made up with a drop at the door so that the billets overhang a ledge. This permits a square-ended peel to be poked through the door and pick up the billet end. The peel is pivoted from a hook on an air hoist suspended from an overhead I-beam monorail and has a long arm to give the heater plenty of leverage on the 167-lb. billet.

Particular pains have been taken to build life into this furnace. The hearth brick, 15 in. thick, is laid over sand-lime brick built up solid from the floor plates. Wall refractories are 13 in. thick and at the soaking zone are confined by heavy ribbed steel castings of box section. These ribs are 1-in. thick and the wall plate is 1½ in. Door bracing

is similar in design, but lighter.

Layout of the equipment has been designed to minimize handling of the crankshafts or billets from machine to machine. The heater, for example, pulls the billet out of the soaking zone and lays it in the lower die, where the hammer man grabs it with a pair of tongs. After the final blow, the crankshaft is picked up by an air hoist on a monorail and transferred to a cooling table in front of the trim press. Momentarily, the countershaft lobes are dipped in water and cooled sufficiently to give the forging strength to hold its shape during the trimming operation. The piece is loaded in the front end of the press, pulled out the back and thrown directly into the flange up-setter. It is pulled out of the upsetter and loaded in the side of the twister, taken out the other side and loaded in a basket.

There are two press men and two upsetter men, so that one man can operate the machine while the other goes after the next piece or loads the cranks into the twister, in the example of the upset men. The equipment is arranged roughly in the form of a semi-circle with both the press and the twister at an angle to the other machines for convenience in loading and unloading as related to the flow from and to other units. Five man-cooler fans are spaced around to direct air at the hot spots: the furnace door, the hammer, in front of the press, between press and upsetter and at the unloading side of the twister. Because of the semi-circular arrangement, there is plenty of freedom of movement, without there being too much space between machines. Altogether the arrangement is quite ideal.

Which Grain Size?

(CONTINUED FROM PAGE 37)

grained steel will all give equally good results on surface hardness.

Summary

To summarize the effect of grain size on hardenability, it can be stated that hardness penetration is a direct function of the grain surface of the steel *when this grain surface is designated as that present in the steel at the time of quenching*. Steels of types B and C, Fig. 2, will give the same hardness penetration as steel D, Fig. 2, if quenched from 1550 deg. F. or

lower. At higher quenching temperatures, steel D will be more shallow hardening than steels B or C, the penetration hardness being, as indicated in Fig. 7, a direct function of the grain surface of the steel. Changing the chemical composition of the steel within the range shown in Table VI, simply raises or lowers the actual hardness values at any given point on the diameter of the piece, without changing the relative penetration of hardness.

When the critical cooling rate is reached or exceeded, surface hardness is independent of grain size (or grain surface), but if for any reason the critical cooling rate is not reached, it is a direct function of grain surface, just as is the case for hardness penetration. The most common causes of soft spots are insulation of the surface by gas or scale films, which decrease the cooling rate to the point at which grain surface becomes a controlling factor in hardenability. Again in this instance the grain surface at the temperature of treatment is the important factor in determining the actual hardness and depth of the soft spots.

If steel is judged solely by a test carried out at temperatures and times different from those used in the heat treating operation, the interpretation of the observed grain size and, therefore, grain surface, may well be extremely misleading and the hardenability of the steel will not correspond to the observed grain size. Any of the methods described by Bain and Vilella will satisfactorily determine the austenitic grain size as it exists at any temperature of treatment.

Finally, it is evident from the foregoing that grain surface at the temperature of treatment is the essential factor in determining type of response to heat treatment. As the McQuaid-Ehn test gives no information as to actual grain size (grain surface) at any temperature other than 1700 deg. F., it should be obvious that its general use is not warranted in predicting the behavior of steels in heat treating operations.

Acknowledgment

The test data presented were obtained at the Cambria plant of the Bethlehem Steel Co. The assistance rendered by the members of the metallurgical department at Cambria is gratefully acknowledged.

How Arc Welding Cuts Costs of Jigs and Fixtures

(CONTINUED FROM PAGE 39)

equipment in the arc welding tool-room is the material from which the tools are to be made. Since steel is the material used in welded tool construction, the supply of material should include mild rolled steel plate, standard structural shapes and bar stock. Assuming a supply of these materials, the usual equipment found in a tool-room, plus an arc welding machine and electrodes and a few inexpensive arc welding accessories, is sufficient for working the materials into usable jigs and fixtures.

The assortment of arc welding electrodes should include electrodes for welding any metal which might be employed in jig and fixture work. Since steel is the principal material used, the electrode kit should include electrodes for flat, vertical or overhead welding in this metal. A mild steel electrode for single-pass welding and for use where fit-up is apt to be poor, will be particularly helpful. There should also be electrodes for welding light-gage steel and high tensile steel.

Electrodes should also be available to provide wear resistance to

production equipment where shock and abrasion are encountered. By means of such electrodes the tool-builder can apply a layer of metal to wearing surfaces and extend their service life many times.

The welding generator should be one of the modern easy-to-operate units, having ample capacity of the proper characteristics and furnishing a uniform welding current. Arc welders are available in a complete range of sizes and types to satisfy any particular requirement. The latest model arc welders provide welding speeds 50 to 200 per cent faster than former types, and will assure maximum savings in tooling with the electric arc process.

Ajax Electrothermic Corp., Trenton, N. J., has just issued Bulletin No. 11 which describes large coreless induction furnaces for melting ferrous and non-ferrous metals. Also included is a new schematic wiring diagram, a discussion of knife contacts vs. flexible leads, and a method of holding the power on the furnace while pouring. The new internally cooled capacitor units also are illustrated. An extended list of United States furnace installations is included.

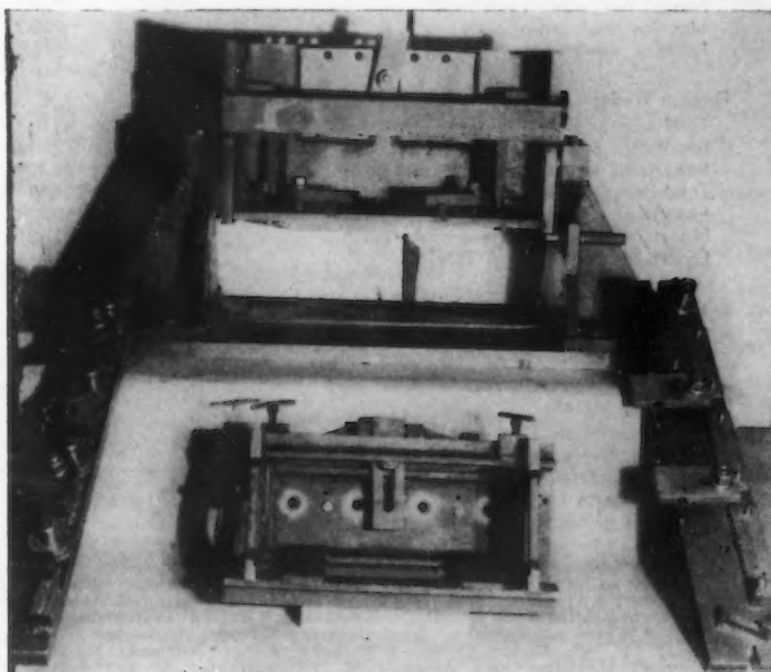


FIG. 12—This trunnion jig (the large unit at the top of the picture) was fabricated at unusually low cost.

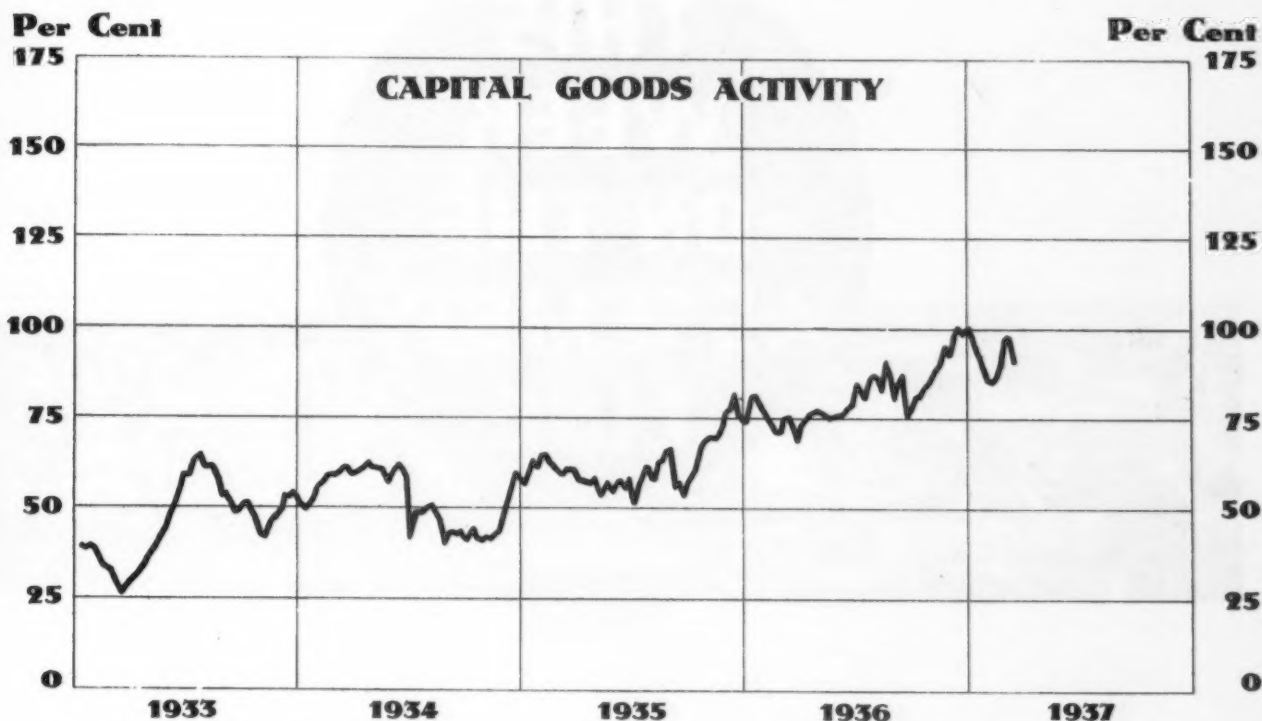
Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	February, 1937	January, 1937	February, 1936	Two Months, 1936	Two Months, 1937
Raw Materials:					
Lake ore consumption (gross tons)*.....	4,443,306	4,694,312	2,632,306	5,583,874	9,137,618
Coke production (net tons) ^b		4,629,532	3,293,542	6,743,884	
Pig Iron:					
Pig iron output—monthly (gross tons)*.....	2,999,218	3,211,500	1,823,706	3,849,591	6,210,718
Pig iron output—daily (gross tons)*.....	107,115	103,597	62,886	64,160	105,266
Castings:					
Malleable castings—production (net tons) ^d		53,638	40,611	88,809	
Malleable castings—orders (net tons) ^d		54,070	38,278	82,130	
Steel castings—production (net tons) ^d		89,649	47,954	92,252	
Steel castings—orders (net tons) ^d		114,939	51,701	110,720	
Steel Ingots:					
Steel ingot production—monthly (gross tons)*.....	4,424,659	4,736,697	2,964,418	6,010,364	9,161,356
Steel ingot production—weekly (gross tons)*.....	1,106,165	1,069,232	716,043	701,326	1,086,756
Steel ingot product—per cent of capacity*.....	84.46	81.64	54.67	53.55	82.97
Finished Steel:					
Trackwork shipments (net tons)*.....	8,153	7,246	4,116	7,482	15,399
Sheet steel sales (net tons) ^e			138,244	313,049	
Sheet steel production (net tons) ^e			191,359	414,359	
Fabricated shape orders (net tons) ^e		130,651	140,943	261,307	
Fabricated shape shipments (net tons) ^e		92,020	78,203	158,198	
Fabricated plate orders (net tons) ^e		40,424	27,863	66,572	
U. S. Steel Corp. shipments (tons) ^b	1,133,724	1,149,918	676,315	1,397,729	2,283,642
Ohio River steel shipments (net tons) ^f		96,400	13,782	79,542	
Fabricated Products:					
Automobile production, U. S. and Canada*.....		399,426	300,874	678,180	
Construction contracts, 37 Eastern States ¹	\$188,590,800	\$242,844,000	\$140,419,100	\$355,211,900	\$431,434,900
Steel barrel shipments (number) ^d		919,290	517,424	1,060,021	
Steel furniture shipments (dollars) ^d		\$2,120,744	\$1,484,145	\$3,070,591	
Steel boiler orders (sq. ft.) ^d		651,063	810,387	1,433,751	
Locomotive orders (number) ^m	33	46	46	60	79
Freight car orders (number) ^m	10,532	10,881	7,236	8,286	21,413
Machine tool index ⁿ	165.2	200.3	112.1	†107.1	†207.7
Foundry equipment index ⁿ	249.5	190.9	110.4	†118.5	†241.2
Foreign Trade:					
Total iron and steel imports (gross tons) ^p		43,063	43,358	93,847	
Imports of pig iron (gross tons) ^p		12,434	14,660	29,693	
Imports of all rolled steel (gross tons) ^p		24,409	18,208	41,166	
Total iron and steel exports (gross tons) ^p		201,511	213,736	455,300	
Exports of all rolled steel (gross tons) ^p		110,139	65,947	145,047	
Exports of finished steel (gross tons) ^p		103,495	62,322	136,576	
Exports of scrap (gross tons) ^p		68,884	142,165	296,071	
British Production:					
British pig iron production (gross tons)*.....	603,700	650,700	584,700	1,180,200	1,254,400
British steel ingot production (gross tons)*.....	995,900	998,900	938,500	1,851,000	1,994,800
Non-Ferrous Metals:					
Lead production (net tons)*.....		43,636	34,127	70,423	
Lead shipments (net tons)*.....		45,718	33,086	67,676	
Zinc production (net tons)*.....	38,010	40,025	36,228	78,145	78,035
Zinc shipments (net tons)*.....	47,591	50,638	39,918	86,386	98,229
Deliveries of tin (gross tons) ^v	7,675	7,615	5,600	12,235	15,290

† Three months' average.

Source of figures: * Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp.; ⁱ United States Engineer, Pittsburgh; ^j When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; ^k F. W. Dodge Corp.; ^l Railway Age; ^m National Machine Tool Builders Association; ⁿ Foundry Equipment Manufacturers Association; ^o Department of Commerce; ^p British Iron and Steel Federation; ^q American Bureau of Metal Statistics; ^r American Zinc Institute, Inc.; ^s New York Commodities Exchange.



THE IRON AGE Weekly Index Numbers of Capital Goods Activity
(1925-27 Average = 100)

Last week	90.9	Same week 1933	27.9
Preceding week	91.1	Same week 1932	37.5
Same week last month	90.3	Same week 1931	72.9
Same week 1936	73.3	Same week 1930	98.9
Same week 1935	60.6	Same week 1929	124.9
Same week 1934	60.6		

* Revised.

THE capital goods industries were a trifle less active last week, and THE IRON AGE's seasonally adjusted index declined 0.2 points to 90.9 per cent of the 1925-27 average from 91.1 per cent in the week preceding. The loss was accounted for largely by decreases in construction and automobile production, as all remaining series used in the index registered gains for the week.

The decline in production by automotive interests reflected a continuance of the labor strike affecting certain large plants in the Detroit area, whereas construction activity eased under a reduced volume of funds available for new enterprise. The country's steel mills, however, continued to increase production, and in lumber shipments there was a considerable improvement over the previous week.

While the fractional drop in the general index

lowered it beneath the preceding period, the decline was noticeably less severe than occurred two weeks ago. At 90.9 per cent of average or "normal," the index accordingly remained safely above comparisons with earlier years. For the corresponding week in 1936, its level had been 73.3, and for the same 1935 week, 60.6.

The actual values used in calculating the index last week are given below.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	89	+2
Automobile production (number of cars and trucks)	98,978	-4,671
Railroad loadings of forest products (number of cars) ..	38,821	+2,401
Pittsburgh industrial production and shipments (index number) ..	112.1	+1.3
Construction contracts awarded (total value)	\$34,569,000	-\$6,519,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from Engineering News-Record.

THIS WEEK ON THE ASSEMBLY LINE



... Gov. Murphy treads softly in Chrysler strike, but starts a State NRA in Michigan and threatens those who defy law.

o o o

... Bills to ban sit-downs are offered in Legislature by Senate floor leader; retail strike racketeers are arrested.

o o o

... Automobile production for last week below 100,000 but spring sales prospects are bright.

DETROIT, March 22. — Commentators everywhere overlook the fact that an unofficial State NRA has been authorized and set up in Michigan by Governor Murphy. Acting without specific authority of law, he offered this solution late in the week as "a logical and orderly and practical way of meeting a practical situation" in the wave of sit-down strikes that have paralyzed Detroit recently.

Aided both by industry and labor, the Governor already has named one unofficial group that fits the pattern of the code authorities of NRA days. In addition, he proposes a whole series of such bodies, offering State legislation, if needed. He also has set up a civic commit-

tee resembling the well-known Toledo Peace Board. Fr. Frederic Siedenburg, S.J., an officer of the University of Detroit and a former Regional Labor Board chairman under the NRA, is the chairman of this mediation board. Incidentally, a year or more ago Fr. Seidenburg refused to accept appointment as chairman on the Wagner Labor Board because he felt that the board as constituted had no power to act as mediator and was merely set up as a body to prosecute companies guilty of unfair labor practices. The new board will function only by voluntary action of the two parties involved in the dispute.

The Lansing local of the UAW and the sit-downers at the Reo plants in that city telegraphed the

Governor protesting against his informal arbitration board on the basis that it is the first step toward Government control of labor organizations.

One of the sub-committees appointed by the Governor is studying possible legislation intended to restrict organized labor activities as far as sit-down strikes are concerned. Meanwhile, a bill making it a felony to take part in a sit-down strike was offered in the Michigan Legislature by William Palmer, the Senate floor dealer and a Democrat. He also introduced a bill providing compulsory arbitration in labor disputes. The penalty in each case for violation was set at five years' imprisonment and \$2,500 fine. Neither bill had been submitted to the Governor by Palmer, although the inference is that he was acting in conformance with the Governor's general policy.

Murphy Under Fire of Criticism

This trend of the New Deal Governor has received little comment, but a barrage of criticism has been directed at Murphy for his failing to act more drastically while strikers defied court orders to evacuate both the Chrysler plants or a large meat packing house, where \$170,000 worth of food was spoiling while strikers held forth. Actually, Murphy has not acted directly in either of these cases, yet all his attention was being put on a series of sit-downs and lockouts that tied up important hotels in the city and kept most of the department stores closed or under heavy guard. Swift



and drastic action routed the strikers and outside leaders from one big store when 400 policemen, acting with the approval of Murphy and Mayor Frank Couzens, descended on the building at 1:30 o'clock in the morning.

However, Governor Murphy's threat to clamp down with the State's police power to enforce respect for public authority met with a reaction in the automotive battle. Here the sheer strength of numbers in the UAW was counted on by leaders as insurance against forcible ejection from Chrysler property. The UAW declared that it would use flying squadron tactics to place 50,000 workmen around any plant where police activity seemed likely, and several times during the week produced 10,000 or more men at various Chrysler gates. Murphy has said that illegal seizure of property must stop, but is hard pressed to stop it after having held off militiamen at Flint during the General Motors strike.

In the meantime, a new phase has appeared in the labor warfare in Detroit in connection with the retail store strikes. In the first place, the police took swift and drastic action largely on the basis that the men who illegally seized the stores were not regular workers there, but were outside organizers of the unions, almost invariably A. F. of L. affiliates. In at least 15 cases, it was brought to light that these so-called organizers had police records, several of them as members of the notorious Purple Gang, which was broken up

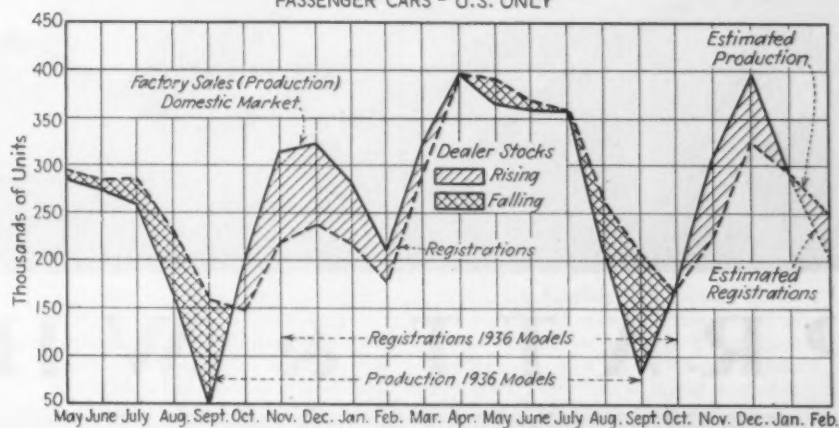
a few years ago. Frank Martel, president of the Detroit and Wayne County Federation of Labor, has disowned most of these men and the UAW has already discharged one of its local organizers found with a police record. This is the first time that the racketeering element has been discovered in the series of sporadic sit-down strikes that have been occurring for the last month.

Effort to Get Chrysler and Lewis To Meet

That Governor Murphy is taking a stronger stand against the illegality of sit-downers taking possession of plants and stores is contained in a statement to the effect that "neither party in any dispute can afford to take a position that is in defiance of the law." Chrysler

officials have reported back to Judge Campbell that his injunction against the sit-downers has been defied and a writ of attachment against the persons of the strikers has been obtained. Sheriff Wilcox and his chief deputy sheriff, Bernard McGrath, have been in conference with the Governor, seeking permission to deputize a large enough force to be of some use against the army of strikers now occupying the nine Chrysler plants in Detroit. Although the Governor has said that "the next step is to determine how such obedience (to the court order) can be obtained," his whole attitude has been to avoid ejection of the strikers by force and to use the gentler art of persuasion wherever possible. Meanwhile attempts were made last week to get Walter Chrysler and John Lewis together to see if they

RELATION OF FACTORY SALES TO DEALERS (PRODUCTION) AND REGISTRATIONS
PASSENGER CARS - U.S. ONLY



**These four books,* on your desk, may point
out your most profitable investment**

Four famous Pratt & Whitney machine tools:—

Jig Borers

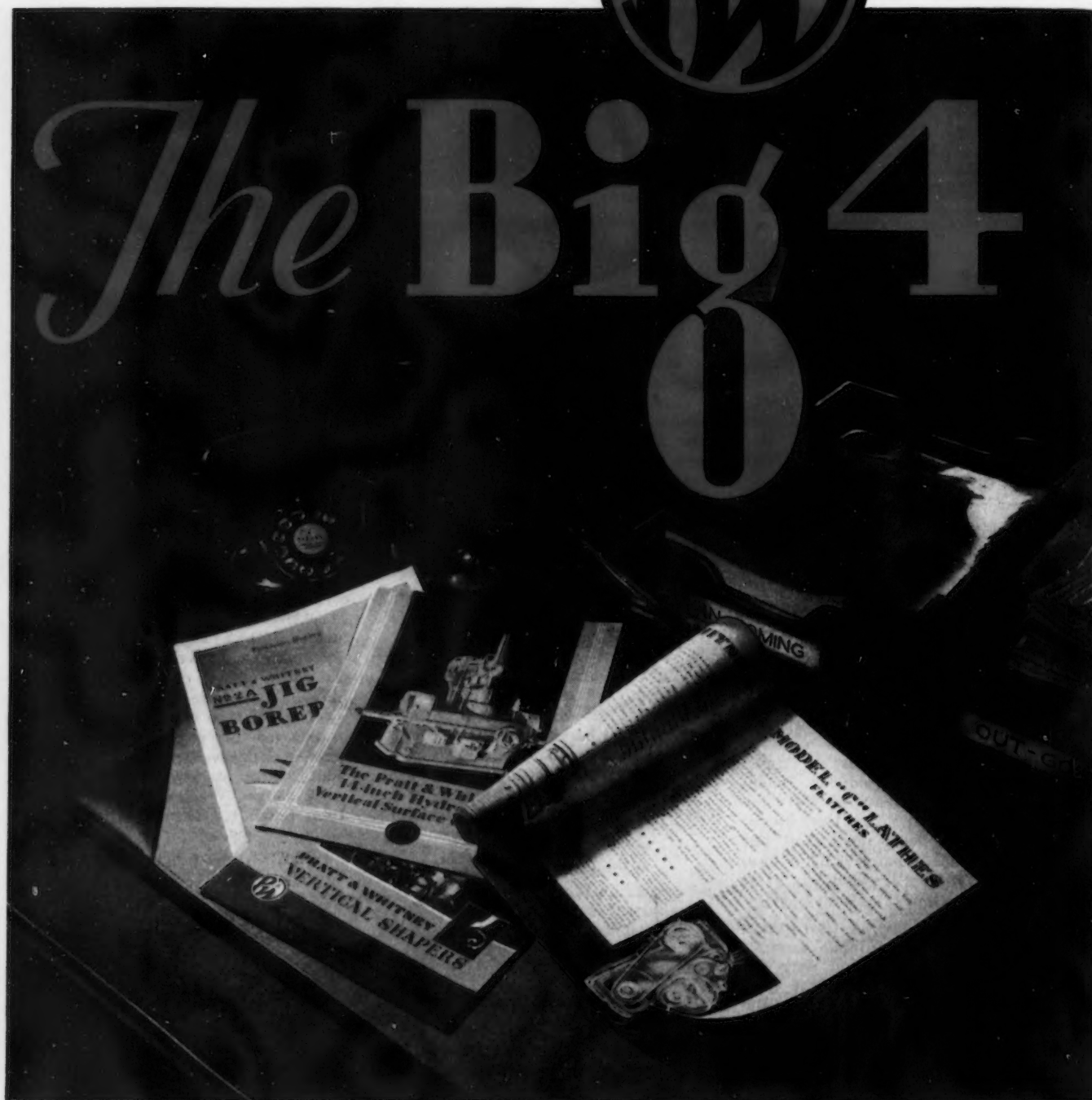
Vertical Shapers

Model "C" Lathes

Hydraulic Vertical Surface Grinders



* Sent free at the
request of any in-
terested executive.



P R A T T & W H I T N E Y

DIVISION NILES-BEMENT-POND CO.

HARTFORD, CONN.

might not settle their differences amicably.

The interstate truck strike ended at the week-end by recognition of the A. F. of L. truckers' and teamsters' union as the exclusive bargaining agency, in addition to the adoption of a minimum wage scale which is to be paid until final agreements are entered into between the union and the operators during the next 60 days. About 200 transportation concerns are involved and the settlement has released 100,000 tons of freight.

Motor Car Output Dips

Automobile production for the week ended March 20 dipped below 100,000 units once more, as a result of the continued difficulties at Chrysler, Hudson and Reo. Ward's Automotive Reports place the week's output at 98,978 passenger cars and trucks in the United States and Canada, compared with 103,649 the previous week and 96,906 in the corresponding period last year. Chrysler production dwindled from 7125 to 1200 units, whereas General Motors and Ford both showed increases. General Motors' output was boosted from 50,813 to 52,455, while Ford's total showed an advance of 1000 units to 31,825. Production should be sustained around the present level until the Chrysler strike is settled. Spring sales should be high and will be limited only by the ability of the motor car companies to produce. With the exception of Chrysler, dealers generally are well stocked in anticipation of a boom season. So far there is little evidence of price increases, although rumors have been floating around during the past week that they might arrive any day. Sales departments which, of course, are a prejudiced source of news, have been indicating all along that a price increase might restrict the market and that they might be able to make up the difference in costs by longer runs on the present jobs.

1938 Model Changes to Be Minor

Apropos of price increases, it is fairly certain at the present writing that the changes in bodies and engines next year will be minor. Hence die and tool costs will be lower. It is expected, for example, that Fisher Body will carry through the same body shells on all of General Motors lines and that the only die changes necessitated will be for fenders and hoods. This will probably hold true for other manufacturers and the absence of any big die program to date bears out this contention. Machine tool inquiries during the past month also indicate that equipment is being bought almost entirely for increase in capacity of cylinder

block lines and the like and that no major mechanical changes are in the wind. There is some talk of worm gears being applied to rear axle drives and even replacing hypoids so generally adopted last year. It is unlikely, however, that these drives will be seen in any 1938 models. The same is true of rear engine cars which exist today only in experimental models that most of the major producers have running around the streets or at their proving grounds.

Commercial cars and light truck lines are being added with surprising rapidity by many manufacturers who have been interested heretofore only in passenger cars. Pontiac is the latest with a new 8-passenger station wagon on its 117-in. wheelbase, 6-cylinder chassis. Plymouth recently introduced a commercial line with several body types on a special truck frame. Hudson steps into the $\frac{3}{4}$ -ton field with a 124-in. wheelbase model in addition to its smaller commercial cars and also adds a Terraplane station wagon. Chevrolet is expected to augment its present truck series, ranging from $\frac{1}{2}$ to $1\frac{1}{2}$ ton, by an in-between model. Attractions of the commercial car sales field have even lured the American Bantam Car Co. of Butler, Pa. (formerly Austin), which has announced a $\frac{1}{4}$ -ton capacity "truck."

Great Lakes Steel Corp. has announced that it will build four additional open-hearth, adding 33 per cent to its melting capacity and bringing the total to 16 open-

hearths of 150-ton nominal capacity. Regular production heats run over 200 tons, however. Great Lakes is also putting in a new blast furnace of 1000 tons daily capacity, doubling the present output of the Hanna furnaces on Zug Island and eliminating the necessity of bringing in pig iron from Buffalo. Ford Motor Co.'s ingot capacity is much below its present needs and it is not unlikely that the company will increase its capacity in this direction in the very near future. Great Lakes' new ingot rate will approach two million tons annually. Thus year by year Detroit is becoming more of a steel producing center, and it is not surprising to find among some of the larger consumers in this area a sentiment in favor of making Detroit a basing point on such important automotive items as sheets and strip.

Armco Earned \$2.73 a Share in 1936

AMERICAN ROLLING MILL CO. reports that its net earnings in 1936 totaled \$6,441,676, equal to \$2.73 a share on the average number of shares outstanding during the year. This compares with a net profit of \$4,313,757 in 1935, and was larger than for any year since 1928.



MANY of the leading automobile producers are figuring on increased motor production for 1938, and it is up to the layout man to devise ways of getting more machinery in a given space. A year or so ago, by efficient layout rearrangement of equipment, Cadillac was able to concentrate four floors of production on the ground floor. John Buser, plant layout engineer, is shown at the board, probably figuring out contemplated changes in the V-16 Cadillac engine line.

WASHINGTON.



... Administrative circles from President Roosevelt down apprehensive over upward spiral of wages and prices.

. . .

... Reserve Board Chairman Eccles proposes higher taxes to prevent economic crisis, but Congress is not favorable.

. . .

... First hearing under Robinson-Patman Act is concluded, with decision favoring respondents on price differentials.

. . .

By L. W. MOFFETT

*Resident Washington Editor,
The Iron Age*

. . .

WASHINGTON, March 23.—Warning signs from administrative sources against an economic crisis, coming from the White House down, have created considerable concern in industrial and financial circles. Among those who have expressed themselves on the subject are Mariner Eccles, chairman of the Federal Reserve Board, Secretary of Commerce Daniel C. Roper and Assistant Secretary of Labor Edward F. McGrady. In all of these statements, the dominant note centers around the upward spiral of wages and prices, their relationship and their inflationary implications unless they are controlled.

The Eccles statement emphasized the danger of too sharp an advance in wages, accompanied by shortened hours, by way of rais-

ing labor costs and prices, so rapidly as to curtail production.

Mr. McGrady sees the nation confronted with economic collapse unless the various branches of the economic order move forward together. He thinks the most important factor that will determine the extent of the present recovery is the price level and recognizes that wage rate increases add to the cost of production and therefore are a factor in the situation. He called for adoption of a national labor policy on wages, prices and labor problems generally.

Mr. Roper warned that if costs rise more rapidly than purchasing power, consumption will tend to decline. He pointed out that the cycle leads directly to "curtailment of production, dwindling employment, reduced purchasing power—the very things that have been so difficult to correct over the past four years." He urged that the situation be studied by all concerned.

Apprehension Over Price Rises

Mr. Eccles said he would continue to advocate a policy of easy money, with a view to attaining full use of the country's productive capacity. Such a money policy, he urged, must be accompanied by

a quick balancing of the Federal budget, an end he would attempt by increased income and profits taxes. But on the score of higher taxes, they are out of the question at the present session of Congress, if the views of leaders in Congress prevail. They strongly oppose the Eccles tax increase proposal. An early balanced budget is not in prospect. Leaders in Congress generally set the fiscal year 1939 for achieving this desirable purpose. But little is being done in reducing the huge Government expenditures as a means of working toward a balanced budget. Nevertheless, statements being issued are looked upon as a warning that government costs must be reduced if inflation is to be avoided.

Mr. Eccles also expressed apprehension over price increases and said that if the upward spiral of wages and prices should lead to inflationary price levels the Government ought to intervene to correct the movement. He did not indicate what form of intervention would be taken, but studies of the wage-price situation are said to be under way and may be used by the administration to determine some policy of control to prevent further inflation.

Mr. McGrady inquired as to



IN UNCONTROLLED ATMOSPHERES

When your product leaves your factory it enters a zone of uncontrolled atmospheres. You don't know just how, where or when atmospheric conditions will attack your product and mar the beauty and serviceability you put into it.

Since you cannot control the atmospheres you can master them by using a sterner metal at strategic points—**SUPERIOR STAINLESS STEEL.**

Our mill also produces hot and cold rolled carbon strip steel and has been so doing for almost 50 years. For applications where you can use carbon strip you will find Superior is of the best quality—uniform and easily workable. Where a better metal is required to maintain its original finish you will be highly pleased with Superior Stainless.

Ask our engineers about any technical problem on which you need assistance.

Superior
STAINLESS STRIP
Steels

SUPERIOR STEEL CORPORATION

GENERAL OFFICE: GRANT BLDG., PITTSBURGH, PA.

WORKS: CARNEGIE, PA.

SALES OFFICES

2002 GIRARD TRUST CO. BLDG., PHILADELPHIA, PA.; 4015 CHRYSLER BLDG., NEW YORK CITY; 1017 FISHER BLDG., DETROIT, MICH.; 122 S. MICHIGAN BLVD., CHICAGO, ILL.; STEEL SALES CORPORATION, 125 S. JEFFERSON ST., CHICAGO, ILL.; H. L. BROWN, 2001 CAREW TOWER, CINCINNATI, OHIO; BRUCE DONALD, BRANTFORD, ONT., CANADA; J. J. BYRNE, AVENUE BLDG., 4500 EUCLID AVE., CLEVELAND, OHIO

BRACE-MUELLER-HUNTLEY, INC.

130 SOUTH ELMWOOD AVE., BUFFALO, N. Y.; 461 LYELL AVE., ROCHESTER, N. Y.; HILLS BLDG., SYRACUSE, N. Y.

whether industry will be satisfied with passing on to the ultimate consumer only those additional costs that are legitimate. "Or will it," he continued, "as only too frequently in the past, take advantage of the situation and use wage rate increases as an opportunity for building up temporary exorbitant profits."

Would Avoid Vicious Spiral

Mr. McGrady's remarks plainly indicate that he thinks price boosts are disproportionate to increased wage costs. This thought is common in Washington, though it is only fair to add that a contrary view also prevails. Steel is prominent in this controversy. Some sources, such as organized labor groups, have made the statement that steel wage increases will amount to only about \$100,000,000 a year, while price increases will run to about \$375,000,000 a year. A study by THE IRON AGE indicated that the two will almost balance—that the wage increase and higher costs of raw materials will amount to about \$200,000,000 compared with about \$208,000,000 in price increases.

"If the price level is increased to the point where the labor population of the nation finds that it has received no gain in its standards of living from wage rate increases, you may rest assured that labor will come back and demand still higher wages," Mr. McGrady declared. "We must devote all our energies to avoiding a repetition of that vicious spiral of still higher prices, still higher wages and all that such a situation implies."

It is not clear what may develop from the attention being given to the situation growing out of wage and price increases and the growing aspects of inflation. It is reported that it may mean a forerunner of new policies on Government spending and price rises and even labor. There is a great deal of doubt, however, that the administration will do much, if anything, to block labor demands for still higher wages and still shorter hours. And obviously, higher labor costs inevitably mean continuance of the upward price spiral. Hence to attempt control of one without attempting control of the others would be futile.

The fifteenth annual convention of the American Institute of Steel Construction, Inc., will be held Oct. 27, 28, and 29, 1937, at the Greenbrier Hotel, White Sulphur Springs, W. Va.

Robinson-Patman Act Test Case A Victory For Price Differentials

WASHINGTON, March 23.—Testimony in the first case brought under the Robinson-Patman anti-price discrimination act was concluded last Tuesday and, interestingly enough, price differentials maintained by the selling respondent were found justified by the Federal Trade Commission accountant. The complaint was directed against Bird & Son, Inc., its subsidiary, the Bird Floor Covering Sales Corp., East Walpole, Mass., and the Montgomery Ward & Co., Chicago. The Bird company was charged with price discrimination in the sale of floor covering to Montgomery Ward and the latter was charged with accepting discriminatory prices. The law thus makes the purchaser equally liable with the seller.

The Bird company contended that its price differentials made to Montgomery Ward, a volume buyer, were justified. To this end it engaged a certified public accountant, Anthony Jaurequy, of Price, Waterhouse & Co., to audit its books and make a report to the commission. This was done. Then the commission had W. J. Warmack, certified public accountant, examine Mr. Jaurequy's report and also make an independent audit of the Bird books. After doing so, Mr. Warmack testified that he had reached the conclusion that the price differentials granted by the Bird Floor Sales Corp., in the sale of floor covering to Montgomery Ward, were justified.

The case being the first under this much discussed law created widespread interest. It is looked upon as a test case, whose outcome may set a standard showing how flexibly the act may be administered in the way of allowing price differentials on quantity sales, applicable to all industries, including iron and steel. The conduct of the case also was watched with interest. While the commission representatives pressed it vigorously, they reflected a spirit of fairness, emphasized by the finding of its cost accountant.

The next step in the case is the preparation of a report to be made to the commission by Trial Examiner Charles F. Diggs, expected to be made soon. Upon the character of the report probably rests the determination of the commission, whether it will dismiss the proceeding or set it for argument.

In any event, as it now stands, it looks as though the law, with its far-reaching potentialities in controlling merchandise price policies, may not be the hard-and-fast weapon that it has been pictured. But this does not mean that decision in the initial case will afford a complete chart of the act's administration. On the contrary, the act is too complicated to be cleared up in a single case, important as is the principle entailed in the Bird-Ward proceeding. But the ultimate outcome of the Bird-Ward case unquestionably will throw light on both the administration and significance of the act.

It may be pointed out, however, that the principals in the case are highly reputable concerns, whose business practices followed long-established and accepted lines. Hence, it does not follow that decision in this case will be a precedent for any but those concerns which carry on business in a similar manner and maintain their books in accordance with the best accounting practices.

Navy to Take Bids For Battleship

WASHINGTON, March 23.—The Navy Department will open bids on June 2 for the construction of a 35,000-ton battleship to be built in a private yard. Another capital ship of the same type will be built in a navy yard.

The Bureau of Supplies and Accounts, Navy Department, will open bids on March 30 for 571 tons of steel bars for stock and for 260 tons of boiler plate for replacement of Naval vessels. On April 2 the bureau will open two bids for 419 tons of high tensile plates and angles for replacement material.

Correction

THE IRON AGE of March 18 (page 56) inadvertently stated that scrap exports in 1936 declined 738,000 tons under those of 1935. The correct figure is 162,928 as indicated by the totals for the two years which were accurately given, 2,103,959 tons in 1935 and 1,941,031 tons in 1936.

Representative Patman Will Press Bill to Prohibit Reciprocal Sales

WASHINGTON, March 23.—Representative Wright Patman of Texas says that his bill to prohibit reciprocal sales will probably affect the steel, aluminum and oil trades more at this time than any other groups. The practice, as it concerns iron and steel products and equipment, is widely accepted as being mutually agreeable to buyers and sellers alike. The practice has been attacked by the Interstate Commerce Commission and on one occasion it attempted to stop reciprocal buying policies in the meat packing industry. It was contended that a meat packing company official attempted to force railroads carrying the traffic of his company to buy equipment from a concern in which he was interested. But where there has been an absence of any pressure for reciprocal buying the policy has not been a source of complaint.

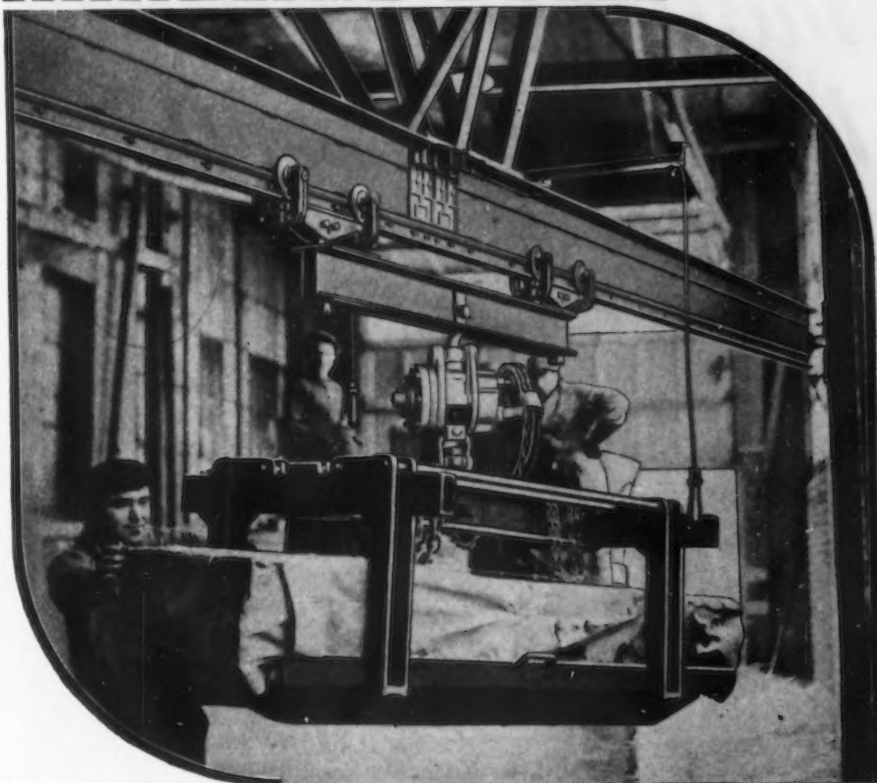
Patman, co-author of the Robinson-Patman Anti-Price Discrimination Act, has announced that a hearing will be held on his bill to prohibit reciprocal selling. The bill has been referred to the House Committee on the Judiciary. Patman says it will prohibit "the large, powerful concerns that handle many products, some of which they have a monopoly on and not handled by competitors from requiring dealers to buy their products which are in competition with other manufacturers, or such dealers will not be selected as customers to buy the commodities they cannot purchase elsewhere." Reciprocal trades and agreements, Patman contends, are not helpful to the small concerns, but represent a very destructive weapon in the hands of the great concerns. If reciprocal trades are continued, he says, the large concerns will in them have a "useful vehicle with which to destroy independent business." Patman singles out the iron and steel industry as one of the industries which would be affected most.

The bill has been offered as an amendment to the Clayton Anti-Trust Act and, if enacted into law—an apparently improbable prospect at the present session of Congress—would be enforced by injunctions obtained by the Department of Justice, the United States district attorneys, or at the request

of the person claiming to be injured in a suit brought for that purpose. It could also be enforced by the Federal Trade Commission through a cease and desist order. Moreover, a suit for triple damages would lie for violation of the act. Patman says the law should not be

any more difficult to enforce than the Interstate Commerce Act, which is now effectively enforced against secret rebates and special discounts on transportation charges and on reciprocal trades involving carriers. He declares that he has information that in many cases higher prices are paid on reciprocal purchases than would have to be paid from smaller dealers, that they tend toward monopoly and reduce competition and should not be "used as a club or threat to force or intimidate buyers."

HANDLING STEEL



the Easy Way

This toughest of all jobs—handling 3 ton bundles of sheet steel—is made easy with American MonoRail equipment. Here you find little damage to sheets—less danger of accident—lower labor costs. In fact, truck loads of steel are moved from dock to storage in one fourth the time formerly required. American MonoRail engineers, with their specialized experience, are ready to help solve your handling problem. Why not let them look at it without obligating you in any way. Write for the 192 page book "Overhead Material Handling Equipment."

AMERICAN MONORAIL CO.

13103 Athens Ave., Cleveland, O.

Fair Designers Make Theme Building Plans

That steel will play a leading role in the New York World's Fair of 1939 was assured when Grover Whalen, president of the fair corporation, disclosed construction details of the Theme Building which will consist of a white sphere 200 ft. high poised on a cluster of fountains, flanked by a slender 700 ft. triangular obelisk.

This sphere, which is to be known as the "Perisphere," will be of articulated steel construction, and will weigh 5,760,000 lb. Both longitudinal and latitudinal trusses will be large and heavy at the bottom and will get progressively smaller and lighter as the top is neared. The entire surface will be covered with some white substance, as yet undetermined. The sphere will be supported by eight columns spaced around a circle 81 ft. in diameter. Each column will be 12 ft. high and 4 ft. thick and will be covered with

a cylindrical jacket. These supports will not be seen by the spectator. Only a gigantic bubble floating on a cluster of fountains will be visible, as the columns are to be encased in glass and sheathed in a jet of water pumped up from the inside. The water will fall back into a circular pool, 8 ft. below the bottom of the sphere.

Mr. Whalen pointed out that the Perisphere will have an inner shell, perforated to absorb sound and prevent reverberations. Insulation will be applied to the interior surface of the outer shell to deaden further all sounds and to protect against exterior heat. The chamber between the two shells will be 4 ft. wide at the top and 16 ft. wide at the bottom. Emergency exits from the interior platform will open into it, and temperature will be kept as low as possible by means of a huge exhaust fan which will draw air out of the top.

The shape of a sphere is said to be the most perfect attainable from the point of view of technical construction. Surface stresses and strains are so balanced that it would be theoretically possible to build a ball this size out of steel plates only $\frac{1}{2}$ in. thick with bracing only at the top and bottom and without girders. The cost of scaffolding for this method of construction, however, led to the decision to use an articulated steel frame.

The tower, to be called the "Trylon," will have a steel frame and a light outer covering. It will have a triangular base measuring 68 ft. on a side, and each of its three sides will be triangles, tapering to a point about 700 ft. in the air.

A bridge will link the sphere to the tower, while from the latter a ramp 900 ft. long will slope gently to the ground curving around the fountain basis beneath the sphere in a huge three-quarter circle. This ramp is described as the "helixline," and will be 50 ft. high at the top, commanding a view of the entire fair.

From the base of the trylon two escalators, said to be the longest moving stairways in the world, with a maximum capacity of 16,000 persons per hr., will mount the 65 ft. to the entrance to the sphere. Entering the sphere, the visitor will descend a short ramp and emerge on a movable platform, which will carry him around the inside of the globe. This platform is to be 14 ft. wide and 450 ft. in circumference and will be suspended at least 12 ft. from the side walls so that a view may be had from either side. It will accommodate 1200 persons at one time, and will require 15 minutes to

Most Economical In Holes Drilled per Dollar



Super Service Uprights are built for those manufacturers who want the best drilling performance obtainable as measured by any practical yardstick. Check against your present equipment and compare and see how much you can save with the convenient single lever control of closely graded speeds and feeds, plus rigidity and power to get the most out of modern cutting tools.

Write for Bulletin U-22

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY CINCINNATI OHIO U.S.A.

*Super
Service*

carry a visitor at the rate of 30 ft. a minute around to the adjacent exit.

Unusual innovations will be effected in the illumination of the sphere and facilities for news broadcasting from the top of the tower.

The designers of the Perisphere are Wallace K. Harrison and J. Andre Fouilhoux, New York architects.

Japanese to Expand Iron, Steel Capacity

TOKIO, Japan (*Special Correspondence*).—The fourth production increase project of the Japan Iron Mfg. Co., involving the construction of a steel plant at Ibogawa in the Kwansai district, will be of about the same scale with the third project which involved the Wanishi Steel Works. The fourth project calls for the construction of three sets of 700-ton blast furnaces, and six sets of 120-ton open-hearth furnaces aiming at an annual production of 700,000 metric tons of pig iron, 500,000 metric tons of steel ingots and 400,000 metric tons of steel materials.

The site for the new plant provided for in the fourth project was selected some time ago at the mouth of the Ibogawa River. The work on the new plant will be started either in June or July this year. The company management plans to start the operation of this plant by the end of 1940.

Legislation Urged to Curb Labor Disputes

LEGISLATION to permit the President of the United States, in the face of a threatened strike or lockout of national magnitude, to appoint a special committee of disinterested persons to ascertain the facts at issue is advocated by the National Association of Manufacturers.

C. M. Chester, chairman of the board, made the proposal public, disclosing that it had the approval of the board of directors of the association and was based upon months of study of the situation. In recent months there has been growing talk of an official plan for permitting the President wider latitude in handling labor controversies.

Under the proposed legislation, as described by Mr. Chester, the ultimate effect would be to "mobilize public opinion in order to avoid disastrous strikes when they threat-

en the security of the whole nation."

The plan, Mr. Chester said, contemplates Federal action, through the President, only when voluntary settlement fails, and only when interstate commerce, communication, the movement of mails, and Federal troops and supplies, or the operations of civil governments are actually prevented or threatened or where essential production is threatened with interruption for the purpose of paralyzing commerce.

"It does not authorize the investigation of local labor disputes which only indirectly or incidentally affect commerce—the fatal defect of the administration of the National Labor Relations Act," Mr. Chester continued. "It does authorize executive intervention in a serious actual or threatened dispute which directly and substantially endangers the economic safety of the nation. It is only the threat of such events that justifies investigation by the President of the United States."



BARTLETT·SNOW

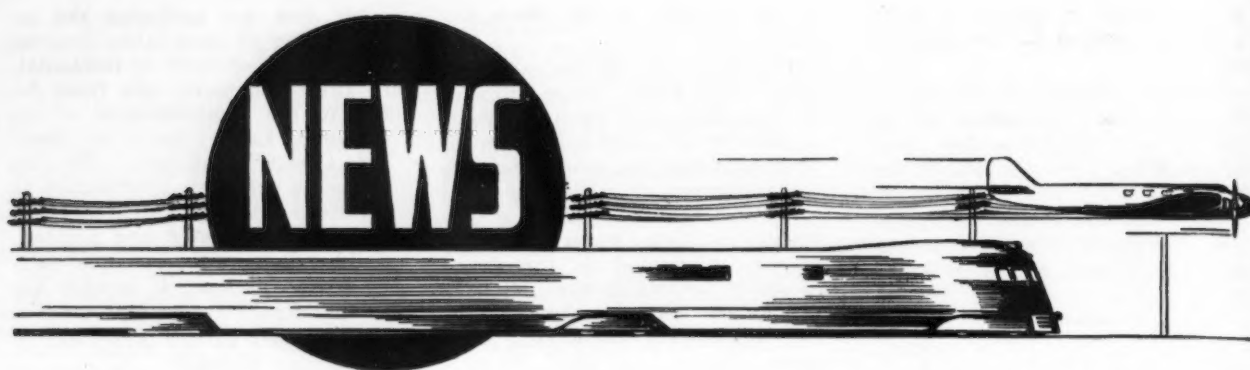
STEEL DRUM PAINTING— PAINT DRYING AND DRUM RECONDITIONING EQUIPMENT

—is demonstrating the efficiency of its design in scores of the country's largest and most representative barrel manufacturing and reconditioning plants. The complete line includes pre-dryers (preparatory to painting), drum revolving machines (for painting), paint booths, low temperature paint drying and high temperature lacquer drying ovens, up-enders, quarter turns, conveyors, etc. . . . and inside and outside washers, testers, dedenters, etc., for reconditioning used drums. Complete or partial installations. Complete details and a fully descriptive catalog will be sent on request. What are your steel drum painting and reconditioning requirements?

THE C.O. BARTLETT-SNOW CO.

6202 HARVARD AVENUE CLEVELAND, OHIO
NEW YORK • CHICAGO • BOSTON • PHILADELPHIA • BALTIMORE • PITTSBURGH

DUST COLLECTORS • CONVEYING AND ELEVATING EQUIPMENT OF ALL KINDS • ROTARY DRYERS AND COOLERS
BOILER PLANT COAL AND FOUNDRY SAND HANDLING EQUIPMENT • CHAINS, SPROCKETS AND BEARINGS
STEEL DRUM PAINTING, PAINT DRYING AND DRUM RECONDITIONING EQUIPMENT



Granite City, Ill., Becomes Basing Point For Tin Plate and Sheets

ESTABLISHMENT of Granite City, Ill., as a basing point for steel sheets and tin plate has been announced by Hayward Niedringhaus, president of the Granite City Steel Co. The new policy, which becomes effective April 1, will result in a savings of \$1.80 per ton to St. Louis buyers purchasing from the Granite City Steel Co., it was explained.

Heretofore the price of steel purchased by St. Louis firms was determined from the Gary, Ind., base, Mr. Niedringhaus pointed out. "To the established price of steel sheets shipped from our mill, for example, was added the freight rate from Gary to St. Louis which amounts to 22c. per 100 lb. in carload lots," he explained. "We are establishing the Granite City base price at 10c. per 100 lb. higher than that of Gary.

New Prices f.o.b. Granite City, Ill.

Coke tin plate.....	\$5.05 per base box
Tin mill black steel sheets, 28 gage.....	3.50 per 100 lb.
Hot-rolled steel sheets, 10 gage.....	2.60 per 100 lb.
Hot-rolled annealed steel sheets, 24 gage.....	3.35 per 100 lb.
Galvanized flat steel sheets, 24 gage.....	4.00 per 100 lb.
Hot-rolled strip steel.....	2.60 per 100 lb.
Cold-rolled steel sheets, 10 gage.....	3.30 per 100 lb.
Cold-rolled steel sheets, 20 gage.....	3.75 per 100 lb.
Porcelain enameling sheets, 10 gage.....	3.10 per 100 lb.
Porcelain enameling sheets, 20 gage.....	3.70 per 100 lb.
Galvanized culvert sheets—not corrugated—16 gage, as follows:	
Granite copper steel culvert sheets.....	4.10 per 100 lb.
Granite copper iron culvert sheets.....	4.40 per 100 lb.
Granite copper bearing pure iron culvert sheets.....	4.45 per 100 lb.
Granite pure iron culvert sheets.....	4.45 per 100 lb.
Galvanized formed roofing and siding steel sheets, 24 gage.....	5.06 base per sq.
Special coating manufacturing ternes.....	4.35 per base box


"It will be seen that the difference between our base price plus

switching charge and the freight rate from Gary to St. Louis

NEWS AND MARKET INDEX

Personals	71	New York Market	96
Obituary	74	Non-ferrous Market	99
Steel Ingot Production	84	Scrap Market and Prices	100-101
Summary of the Week	85	Finishing Iron & Steel Prices	102-103
Pittsburgh Market	86	Warehouse Steel Prices	104-105
Comparison of Prices	87	Pig Iron & Raw Material Prices	106
Chicago Market	90	Fabricated Steel	98
Philadelphia Market	92	Machine Tool Activity	108
Cleveland Market	94	Plant Expansion & Equipment	109

The REED PUTS **ERRORS** ON THE *Spot*




Magnification 5,000



Magnification 1,000



Electric Gage

Although the use of steel reeds has long been familiar to all veteran machine designers, the development of the special double reed mechanism, and its application to gaging, was nothing short of an inspiration. This mechanism provides the gage designer with a very simple means of mechanical amplification which can be accurately controlled and one that completely eliminates all the customary causes for inaccuracy, inherent in conventional gages.

The Reed mechanism incorporates no gears, knife edges, pivots or levers. Its operation does not require any sliding of one element over another. It eliminates friction and the wear resulting from friction. There is nothing about the Reed mechanism to wear out of adjustment. It will be just as accurate and sensitive ten years from today as it is right now.

The use of the Reed mechanism is an exclusive feature of Sheffield Visuals gages.

Any error in a work part brought between the anvil and gaging element of a Sheffield Visual is measured instantly, and its value flashed on the graduated dial of the gage. No error can evade detection. Operation is rapid—up to 3600 parts per hour checked to half a "tenth" or closer.

Put your inspection on a precision basis with Sheffield Visuals.

MASTER  GAGEMAKERS

SHEFFIELD GAGE CORPORATION

Dayton, Ohio, U. S. A.



amounts to 9c. per 100 lb., or a savings of \$1.80 per ton to St. Louis steel buyers.

"The Granite City Steel Co. is primarily a Mississippi Valley mill serving St. Louis fabricators of steel, and we were motivated in the decision to establish Granite City as a base point by our conviction that such a move will accrue to the advantage of St. Louis fabricators.

"The St. Louis district has been advancing steadily during the past 15 years as a steel manufacturing center, but as a steel fabricating

center it has not been going forward apace. The effect of establishment of Granite City as a basing point will, we believe, put St. Louis on the map as a steel fabricating district."

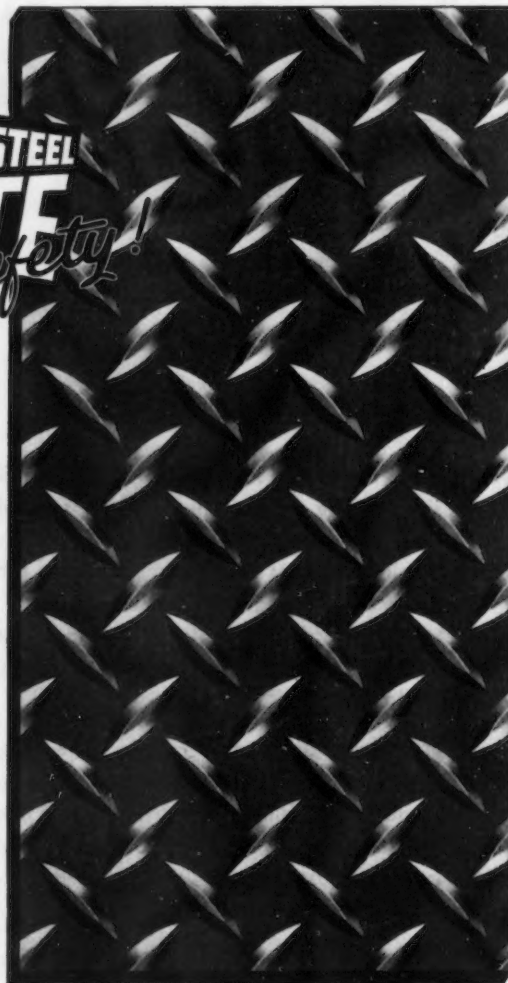
Some idea of the significance of the Granite City Steel Co.'s announcement may be gained from the fact that, in a normal year, metropolitan St. Louis should be a market for approximately 300,000 tons of finished steel products, according to an estimate by the St. Louis Chamber of Commerce.

Specify
"A.W." ROLLED STEEL
FLOOR PLATE
for Safety!

"A. W." Rolled Steel Floor Plate is, above all else, engineered for safety. It gives men's feet a firm, safe grip—keeps their minds free from worry over loss of balance—speeds their work—and protects management as well as men against accidents.

But, in addition, "A.W." Floor Plate makes the most sanitary flooring—it drains quickly—is easily kept clean. And it is oil proof, crack proof, heat proof. It is the toughest flooring you can install—and will lick your toughest flooring problem.

Installation is quick—and PERMANENT. First cost is low.



"A. W." Super-Diamond pattern shown half size.

There is no maintenance cost.

Write for literature giving engineering data and illustrating 5 Floor Plate patterns to meet every possible flooring problem in industry.

ALAN WOOD STEEL CO.
CONSHOHOCKEN, PA.

Branches: Philadelphia, New York, Boston, Detroit, Los Angeles, San Francisco, Seattle, Houston

111 YEARS' IRON AND STEEL MAKING EXPERIENCE

Sheriff Sells Newton Steel Co.

THE plant of the Newton Steel Co., Newton Falls, Ohio, was sold in Warren, Ohio, March 16 at sheriff's sale, under foreclosure proceedings for \$302,000, to the Central National Bank, Cleveland, and H. R. Harris, trustees for the holders of \$2,866,000 principal amount 7 per cent first mortgage gold bonds. The property was appraised at \$450,000. The bonds were pledged under a general mortgage of the Republic Steel Corp. to the Chemical Bank & Trust Co., New York, and Howard B. Smith, trustees, being owned by Republic subject to the pledge. The defaulted bonds were part of an original issue of \$4,000,000 issued in 1932. Included in the bond issue were \$1,000,000 of bonds acquired by the Corrigan, McKinney Steel Co. when it took over Newton in 1932 and which came into the possession of Republic when that corporation acquired the Corrigan, McKinney properties.

Roemer Bigger Factor In Empire Company

THAT the Roemer steel interests have become a more important factor in the management of the Empire Sheet & Tin Plate Co., Mansfield, Ohio, is indicated by the selection of new members for the Empire board of directors. In addition to the election of Henry A. Roemer, president of Pittsburgh Steel Co., Sharon Steel Corp. and Niles Rolling Mill Co., as chairman of the board as announced last week, three other new members were elected by the stockholders at a meeting last week. These are C. E. Kibbee, vice-president of Sharon Steel; A. E. Walker, vice-president of Pittsburgh Steel, and James M. Hill, general manager of the Empire company. Mr. Roemer has been a director of the Empire company for some time. As announced by C. H. Henkel, president of Empire company, the merger of that company with the Pittsburgh and Sharon companies is not contemplated.

The stockholders gave Mr. Roemer the right to purchase 9000 shares of unissued common stock at \$10 per share. The Empire company earned \$8,195 during the last quarter of 1936 as against a loss of \$380,240 during the first three periods. Profits during January and February of this year were more than \$42,000.

Bethlehem Employees Favor Plan of Representation by a 96 Per Cent Vote

BETHLEHEM, Pa., March 22.—A 96 per cent vote for the employees' representation plan as their collective bargaining agency was cast by employees of Bethlehem Steel Corp. at the twentieth annual elections of employees' representatives held by the employees at various Bethlehem plants during the past few days, according to the final returns announced by the election tellers Sunday.

All employees of over 60 days' service were eligible to vote, except the managerial and supervisory staff. Out of 60,530 available voters in the 23 plants where elections were held, 58,356, or 96.4 per cent, cast ballots designating the representation plan as their collective bargaining agency and elected 462 employees' representatives for the coming year.

Asked what effect this vote for the employees' representation plan would have on Bethlehem's dealings with outside unions, company officials stated that its long established policy of bargaining with any group of employees or with anyone representing any of them will continue as heretofore.

The company stated that while, as the recent elections show, the great majority of its employees had preferred to negotiate through their representation plans, which are among the oldest in existence, it has also dealt with minority groups including the Amalgamated Association of Iron, Steel and Tin Workers and other labor unions whenever requested by them to do so. As for dealing with the Steel Workers Organizing Committee, newly established bargaining agency for steel employees affiliated with the CIO, the company stated that negotiations were going on in some of its plants with the SWOC for those employees whom they represent.

Bethlehem's Policy

Bethlehem's full statement amplifying its policy regarding collective bargaining reads as follows: "Statement of Policy on Collective Bargaining.

"While the principle of collective bargaining has been relatively new in some institutions, and while this principle has been a matter of legislative enactment only in recent years, collective bargaining has been in full operation in the plants of Bethlehem Steel Corp. for nearly 20 years. Because of its belief

in collective bargaining, Bethlehem many years ago provided effective and responsible organizations at all its plants to deal with its employees on all phases of employee-management relations.

"This principle has been applied not only through the employees'

plans of representation in Bethlehem plants, but also through negotiation with individuals and other groups who have claimed to represent any of our employees.

"The managements at the Bethlehem plants whenever requested have dealt with the Amalgamated Association of Iron, Steel and Tin Workers, the International Association of Machinists, the Brotherhood of Railway Trainmen, and other labor union groups. The same principle holds good with the Steel Workers Organizing Committee,

CLARK BOLTS

FOR ANY JOB



Eighty-two years of performance, service, dependability, and experience back of every CLARK Bolt, Nut, Screw and Rivet.

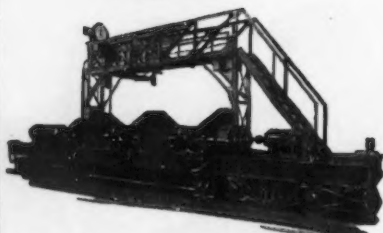
Standards and Special.

Write for latest catalog.

Let us quote.

CLARK BROS BOLT CO.
MILDDALE, CONN.

ATLAS CARS



Double Compartment Scale Car with Overhead Operator's Platform. Car provided with Orr Bin Gate Operating Mechanism.



20 Ton Capacity Double Compartment Scale Car for use with Orr type Bin Gates controlled from Operator's Station on Scale Car.

Atlas Products

Gas Electric and Diesel-Electric Locomotives
Electric Transfer Cars for Blast Furnaces and Steel Plants
Stockhouse Scale Cars for Blast Furnaces
Concentrate and Calcine Cars for Copper Refineries
Automatic and Remote Controlled Electric Cars
Pushers, Levellers and Door Extractors
Coal Charging Lorries, Coke Guides and Clay Carriers
Atlas Patented Coke Quenching Cars for By-Product Coke Ovens
Atlas Patented Indicating and Recording Scales
Special Cars and Electrically Operated Cars for every conceivable purpose.

THE ATLAS CAR & MFG. CO.

Engineers - Manufacturers

1140 Ivanhoe Rd., Cleveland, O.

new established agency for steel employees affiliated with the CIO and negotiations are now going on in some of our plants with the SWOC for those of our employees whom they represent.

"The management of the units in each district of our operations has had a consistently open policy on collective bargaining which may be stated as follows:

"The management at any of our plants will meet at mutually convenient times with any persons claiming directly or through any organization to be representatives of any of our employees, and we will consider with them any matters of interest to our employees which they may present to us; that is, we will bargain collectively with them.

"We recognize that collective bargaining must be conducted in a manner satisfactory to our employees. Most of the negotiations have been conducted through their representatives under their plans of employees' representation, as that has been the method designated in most instances by our working forces. But we also recognize that minorities and individuals have the right to bargain for themselves or through their representatives, and we can point to an extended record of negotiation with special groups and individuals representing some of our employees."

New Ownership for Federal Machine Co.

FEDERAL MACHINE & WELDER CO., Warren, Ohio, has been sold to new interests headed by Ross W. Judson, Detroit, organizer and for many years president of the Continental Motors Corp. Two or three other men are understood to have become associated with Mr. Judson in the purchase of the Federal plant. The Federal company has long been under the active management of F. P. McBerty, the founder of the business, and president of the company.

The Federal company under the new ownership will be under the presidency of Malcolm Clark, who has been general manager of the Taylor-Winfield Corp., Warren. Mr. McBerty will remain with the company for a year or more in a consulting capacity. Mrs. Z. A. McBerty, secretary and treasurer, will retire.

The Federal company is one of the leading manufacturers of welding equipment and has played an important part in developments in that field. Its products include spot, butt, flash, seam and arc welding machines.

Great Lakes Lets Coke Oven Contract

THE Semet-Solvay Co. has been awarded by the Great Lakes Steel Corp. of Detroit a contract for a 130-oven by-product coke plant. The project calls for the construction on Zug Island, on the Detroit River, of two batteries of Semet-Solvay vertical flue combination ovens. The by-product plant will include a benzol refining unit. Also, the program provides for equipment for the unloading of coal from boats and coal storage.

The design of the coke ovens provides for heating with blast furnace gas, releasing the coke oven gas to the steel mills. The coke oven gas will be piped through a large gas line to the mills at Ecorse, some three miles distant.

English Rails World's Longest

A HUNDRED tons of steel rails, each 120 ft. in length and rolled by the Skinningrove Iron Co., were laid on the London & North Eastern Railway main line several weeks ago, in England. These are believed to be the longest rails ever yet rolled in one piece in any part of the world.

The longest rails hitherto manufactured were 90 ft. in length and were used in special circumstances, but the standard length of rail is 60 ft.

The 120-ft. rails were laid on a stretch of track at Holme, near Peterborough, England, where expresses, including the Silver Jubilee, attain a speed of 90 miles per hr. By the use of longer rail units it is hoped that smoother running will be secured by reducing the number of joints and by simplifying the work of maintaining the track.

The Skinningrove Iron Co. was the first in Britain to manufacture 90-ft. rails.

United Engineering Raises Wages

UNITED ENGINEERING & FOUNDRY CO., Pittsburgh, has increased all labor rates by 10c. an hr., which raises the basic labor rate from 53c. to 63c. an hr. Salaried workers had their pay adjusted on Jan. 1, but it is reported that additional adjustment will be made soon for those in the lower bracket.



BALANCE

LENDS ADAPTABILITY

SAE 1112

Good performance depends on perfect balance . . . whether putting on a rope act, or developing a screw stock.

That is why B & L engineers have been able to develop a better grade of SAE 1112 . . . and add another score to their record of successful screw steels.

This veteran screw stock has been modernized in machine performance and service qualities. It is produced under close metallurgical control to specified B & L standards. The result is a well balanced Bessemer of increased adaptability . . . with good machining character consistent with dependability in finished parts.

SAE 1112 as now made under this careful supervision has been found to be an ideal steel specification for the general run of automatic screw machine parts, fabricated on equipment of limited peripheral speed. If such parts are of complicated machine character, or fabricated on modern high speed equipment, then Ultra-Cut would be the steel to use.

These two grades of B & L Cold Finished Screw Steel have a very definite place in industry, and we would welcome your inquiry concerning them.

●
Cold Drawn Bars
Ground Shafting
Ultra-Cut Steel
Special Sections
Extra Wide Flats
Alloy Steels
●

BLISS & LAUGHLIN, INC.

HARVEY, ILL.

Sales Offices in all Principal Cities

BUFFALO, N.Y.

U. S. Steel Chooses New Site For Continuous Mill at Clairton

A SUBSTANTIAL revision of the broad modernization program of the United States Steel Corp. in the Pittsburgh district, which was covered in detail in THE IRON AGE, issue of Jan. 21, has been announced. Instead of altering operations at the present location of the Clairton by-products coke and

steel works, as stated at that time, the program now calls for the construction of the plant at a new location. The new sheet and strip mill will be named the Irvin Works in honor of William A. Irvin, president, U. S. Steel Corp.

The plant will be built near the present Clairton operations in the

Camden district on high ground overlooking the Monongahela River. For this purpose Carnegie-Illinois has purchased tracts totaling 600 acres, and the location lies in the angle formed by the Clairton-Dravosburg section of Pennsylvania Highway 837 on the east, and the paved New England road on the south and southwest.

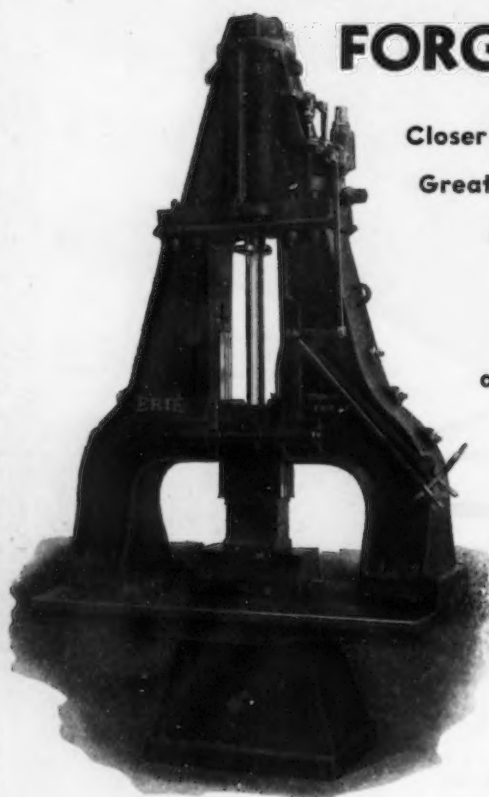
With the plant to be constructed on an entirely new location, there will be no necessity for dismantling present steel-making facilities at Carnegie-Illinois' Clairton works. Instead, current operations there will be continued and certain portions of the plant will be reconditioned, particularly the open-hearth department, where ingot production will be increased by 18,000 tons a month through the firing up of three furnaces idle since 1932.

The new program does not alter the previously announced addition at Edgar Thomson works, Braddock, Pa., of a slabbing mill with 1,000,000 tons annual capacity to supply semi-finished steel for the Irvin works and other plants of the company.

The new 80-in. continuous strip and sheet mill is expected to be completed and in production within the next year. It is estimated that about 4000 men will be employed at the Irvin works when it reaches capacity operation. H. G. McIlvried, recently transferred from the Chicago district of Carnegie-Illinois as assistant to William C. Oberg, manager of operations, Pittsburgh district, will have charge of the construction of the new plant.

The Union Railroad, a subsidiary of the U. S. Steel Corp., traverses the entire edge of the site at which the new mill will be located. Slabs from the Edgar Thomson mill will be conveyed to the Irvin works by the Union Railroad.

ERIE DOUBLE FRAME HAMMERS FORGE AHEAD!



Closer Competition Demands

Greater Economy Through

Added Strength

More Speed

More Power

and Lower Steam

Consumption

The newly designed line of ERIE double frame forging hammers has all these advantages, plus eye-appeal. Within six months after this design was brought out more double frame hammers were sold than in the previous ten years. Are you awake to the possibilities for increased economies in your plant?

As Modern in Action as in Appearance

Pocketbook-Appeal as Well as Eye-Appeal

ERIE FOUNDRY COMPANY, ERIE, PENNA., U. S. A.

DETROIT:
CHICAGO:

335 CURTIS BUILDING
549 WASHINGTON BLVD.

INDIANAPOLIS: 335 POSTAL STATION BUILDING
PARIS, FRANCE: 8 RUE DE ROCROY



Brown & Sharpe Graduates Meet

THE first general gathering of graduates from the Brown & Sharpe Mfg. Co.'s apprentice training school was held recently in Providence, R. I. Of approximately 300 present, about two-thirds are in the employ of the company, while the remainder are situated in Massachusetts, Connecticut, Vermont, New Jersey, New York and Illinois. A large number of the graduates now hold executive positions, while others own businesses or are principal partners. The oldest graduate attending was Frank H. Lord, machinist of 1882. Charles F. Northup, second oldest present, was in the machinist class of 1884.



..PERSONALS..

J. EDWARD WEIT, vice-president, sales manager and director of the Atlas Bolt & Screw Co., Cleveland, and a pioneer in the bolt and nut industry, recently celebrated the 50th anniversary of his industrial activities, over 37 years of which were spent in the bolt and nut field. A native of Cleveland and now in his 65th year, Mr. Weit left high school when 14 years old and secured employment as an errand boy with a Cleveland wholesale dealer in rubber goods and mill supplies. Later he became head bookkeeper. In 1900 he secured employment with the Atlas Bolt & Screw Co. as assistant bookkeeper and later was transferred to the sales department of which he eventually became the head.



LEONARD A. YODER has been appointed vice-president and assistant manager of the Yoder Co., Cleveland. He was formerly sales manager and has been succeeded in that capacity by JOHN LUCAS, who was assistant sales manager.



CHARLES F. LANGER, assistant superintendent of the cold strip department at the Warren works of Republic Steel Corp., has been transferred to Cleveland to act as superintendent of the new 98-in. cold strip mill now under construction. After attending Carnegie Institute of Technology in Pittsburgh, Mr. Langer was employed by the engineering department of the Superior Steel Co., Pittsburgh, in 1914 and in 1924 went to the Blair Strip Steel Co., Newcastle, where he was employed as superintendent. In 1926 he became assistant superintendent of the hot strip mills of the Weirton Steel Co. He went to Warren in 1928 as turn foreman in the cold strip department and was appointed assistant superintendent of the department in 1935.



GEORGE H. CHENEY, who retired in 1930 after 20 years' association as supervisor of equipment at Studebaker Corp. in Detroit and South Bend, has recently joined the Cadillac Machinery Co., Detroit, as manager of sales. Mr. Cheney, who is 67 years old, was persuaded to go out of retirement by C. L. Campbell, president of Cadillac

Machinery, a close personal friend for the last 25 years. When Mr. Campbell is out of the city, Mr. Cheney will be in full charge of the office. DAN MILLS, after five years of association with the field circulation department of McGraw-Hill Publishing Co., has joined the Cadillac Machinery Co. as a sales engineer. Mr. Mills spent most of his time in the Detroit area on the industrial papers of McGraw-Hill and has a wide acquaintance among manufacturing executives in the automotive indus-

try. WILLIAM H. MORETON has also joined the Cadillac organization as a sales specialist. Mr. Moreton at one time was purchasing agent, specializing in equipment, for the former Central Products Co., which included the Central Gear Co., the Central Axle Co. and Central Forge Co., now known as the Gear & Axle division of the Chevrolet Motor Co. In the more recent past he was district sales manager of the Bruce Products Co., Detroit. THOMAS REDMOND has resigned from the Cadil-



IF all cutting lubricants were sterilized with Derma-San, Oil Dermatitis would be rare. This powerful disinfectant kills pus-forming germs—keeps workers' efficiency at par. Add 1 pint to 35 gallons of lubricant and protect your men from infection.

The HUNTINGTON LABORATORIES Inc.

DENVER HUNTINGTON, INDIANA TORONTO

DERMA-SAN

disinfectant

lac Machinery Co., with which he has been associated for 15 years, the last two of which he served as secretary-treasurer. His plans for the future have not been announced.

♦ ♦ ♦

R. C. KLEMM has been appointed manager of sales of the bolt and nut division of Republic Steel Corp., to succeed C. F. NEWPHER, who resigned to join the National Screw & Mfg. Co., Cleveland. Mr. Klemm has been associated with

the Republic Steel Corp. and its predecessor companies for 25 years.

HARRIS W. SCHRENK has been appointed manager of sales of the tool steel department, filling the vacancy caused by the recent death of Frank J. Bauman. Mr. Schrenk has been associated with the tool steel department for a number of years.

♦ ♦ ♦

R. J. SOUTHWELL has been appointed sales manager of the Andrew C. Campbell division of

the American Chain & Cable Co., Inc., Bridgeport, Conn.

♦ ♦ ♦

EDWIN T. DODDRIDGE, for the past 25 years with the Osborn Mfg. Co., Cleveland, has been appointed vice-president in charge of sales of the William H. Nicholls Co., Richmond Hill, N. Y. He has spent all of his business life in the foundry and foundry equipment field.

♦ ♦ ♦

P. M. CULYER, who has been identified with the Russell, Burd-sall & Ward Bolt & Nut Co., Port Chester, N. Y., since 1910, has been elected purchasing agent, succeeding HOWARD E. MARSHALL. Mr. Culyer spent the first seven years in the cost department, then went into the purchasing department. He has been assistant purchasing agent since 1917.

HOWARD E. MARSHALL, who has retired as purchasing agent, started with the company in 1879 in a clerical position in the company's original plant at Pemberwick, Conn. He has been purchasing agent for 36 years and director since 1901.

♦ ♦ ♦

J. B. TROTMAN, for many years associated with Goulds Pumps, Inc., has been made manager of the "T" pump division of Roots-Connersville Blower Corp., Connersville, Ind.

♦ ♦ ♦

CHARLES R. HOOK, president, American Rolling Mill Co., Middletown, Ohio, has been elected a director of the Rustless Iron & Steel Corp., Baltimore.

♦ ♦ ♦

D. W. MACDONALD has been elected a director of the Erie Foundry Co., Erie, Pa.

♦ ♦ ♦

T. S. LONG has been made assistant sales manager of the Warren, Ohio, plant of the Taylor-Winfield Corp., Warren, Ohio. W. H. MARION has been appointed purchasing agent, and J. D. ANDERSON has become purchasing agent of the company's Detroit plant.

♦ ♦ ♦

B. A. BROMWELL, hertofore Washington representative for the Wayne Agricultural Works, Inc., Goldsboro, N. C., has been made assistant sales manager in charge of Southern sales. He will make his headquarters at the plant.

♦ ♦ ♦

SYDNEY BUCKLEY, president of the Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., has been elected chairman of the Elec-

PERKINS MAN COOLERS

TRADE MARK REG. U. S. PAT. OFF.



This scientifically constructed giant fan produces constant recirculation of air, evaporating perspiration, keeping workers' bodies at normal temperature.

This means better work, fewer errors, greater volume.

Made in oscillating and stationary types (portable) and bracket type for fixed location.

B. F. PERKINS & SON, INC.
HOLYOKE, MASS

tric Hoist Manufacturers Association, succeeding C. A. MOORE, of the Shaw-Box Crane & Hoist Co. J. F. COOKE, electric hoist sales manager, American Engineering Co., Philadelphia, has been elected vice-chairman.

F. J. STAROBA, for the past five years identified with the Chicago office of the Carboloy Co., Detroit, has been appointed district representative to cover Southern Illinois, Missouri and Kansas.

WILLIAM W. COLEMAN, president of the Bucyrus-Erie Co., South Milwaukee, Wis., and Mrs. Coleman, sailed from New York on March 19 for an extended Mediterranean cruise, at the end of which they will proceed to England for the coronation in May.

W. A. JAYME has been appointed general superintendent of the W. DeWees Wood works of the Carnegie-Illinois Steel Corp., McKeesport, Pa., as successor to H. H. Giles, who died early in February. Mr. Jayme, a graduate of the Massachusetts Institute of Technology, was manager of the alloy division, metallurgical department. He has been in the employ of Carnegie-Illinois since November, 1935, beginning as contact man of the metallurgical department. He took the position of manager of the alloy division in June, 1936. Before going to Carnegie-Illinois, Mr. Jayme was employed by the Crucible Steel Co. of America, Park Works; the United Alloy Steel Co., Canton, Ohio; the Reading Iron Co., Reading, Pa., and for a short time only, the Studebaker Corp., South Bend, Ind.

CARL M. NYSTROM, acting superintendent for the past six weeks, will become assistant general superintendent of the W. DeWees Wood Works. Mr. Nystrom began with Carnegie-Illinois as a metallographist in January, 1926. He was appointed foreman of the chrome polishing and inspection department on Dec. 1, 1928.

F. E. FIEGER has resigned as vice-president and director of Jones & Laughlin Steel Corp. Mr. Fieger was associated with Jones & Laughlin for 20 years, having started with them in 1917 as superintendent of the wire department at the Aliquippa works. The following year he became superintendent of the steel works department. In 1920 he was made assistant general superintendent, and in 1923 general superintendent of the Ali-

quippa works. In 1928 Mr. Fieger was made assistant general manager, and the following year, general manager. He was elected vice-president, a director and member of the executive committee in 1935.

JAMES E. LOSE, vice-president in charge of operations, Carnegie-Illinois Steel Corp., was honored at Clairton on March 22, when one of the company's largest steamers was given his name. The steamer is of the second series in size of

the Carnegie-Illinois fleet of 18 towboats, and is one of three designed for use in larger inland waters, the lower Ohio and the Mississippi.

C. L. SHIPLEY has been appointed by the Champion Rivet Co., Cleveland, as Pittsburgh district sales manager for its welding electrodes. He has been connected with the company for 10 years, having served both in the operating and sales division at the headquarters in Cleveland.

WHAT could be more fitting than a mascot to dramatize the Permanent "Stick-to-it-iveness" (Adhesion) of Blue Knight Flexible Finishes! Steel tubes finished with these coatings can be banged together hard . . . and the finish doesn't Chip, Flake or Peel! The Blue Knight wants to symbolize the permanent *Flexibility* of Roxalin Finishes. Got any ideas for another mascot?

See our Exhibit at the Metals & Plastics Bureau, 3rd Floor, International Building, Rockefeller Center, New York City.



FLEXIBILITY AND ADHESION

Plus! **NO FATTY EDGES on This Texture Finish!**

RINCON-TROL, easily-applied, gives a beautiful, *uniform* (small crater) texture on great surfaces like air-conditioning units 3'6" x 5'6" x 3'3" . . . or on the tiny areas offered by buttons. There are NO FATTY EDGES . . . the common abomination of most texture coatings. It hides defects in castings or other metal surfaces. This handsome fine-grained finish is highly resistant to perspiration.

Ask us to send you (without obligation) a panel or a die-casting finished in RINCON-TROL that demonstrates easily achieved, *beautiful* uniformity of texture and freedom from fatty edges.

Please address your request to Roxalin Flexible Lacquer Co., Inc., Box 273, Elizabeth, N. J.

ROXALIN *Flexible* **FINISHES**

CELLULOSE & SYNTHETIC TYPES
ENGINEERED FOR SPECIFIC PERFORMANCE

THE IRON AGE, March 25, 1937—73

...OBITUARY...

GRANGER WHITNEY, old-time operator of Midwest blast furnaces, died March 18 in his home at Detroit. Mr. Whitney, who was

70 years old, was born in Beverley, Mass., and was graduated from Massachusetts Institute of Technology. He operated blast furnaces in South Chicago and La Follete, Tenn., before moving to Detroit in 1905 and managed the blast furnaces for the Detroit Iron & Steel Co. until his retirement in 1911.

EDWIN M. BASSLER, general manager of the D. J. Murray Mfg. Co., Wausau, Wis., pioneer builder of

machinery for sawmills and paper and pulp mills, died on March 14, aged 68 years. He joined the former Bayley Mfg. Co., Milwaukee, in 1914 as a director, secretary and chief engineer, retiring when the concern was reorganized as the Bayley Blower Co. in 1928. He took charge of the Murray business in 1932.

EDWARD PARKER BURRELL, director of engineering, Warner & Swasey Co., Cleveland, died March 21 after a brief illness at the age of 66 years. He was successively designing engineer, works engineer and works manager of the Warner & Swasey Co. from 1909 to 1924 and since the latter year had been director of engineering. He was prominently known as a designer both of turret lathes and telescopes. He is credited with the development of the hollow-hexagon line of turret lathes manufactured by the Warner & Swasey Co. and with various other developments in that field, including

★ Specialists in Alloy and Tool Steel TUBING

Our concentration on tubing enables us to give customers the benefit of our special skill and experience. Large stocks available for immediate shipment—Tool Steel Tubing, Ball Bearing Tubing, Stainless Tubing, Aircraft Tubing, Hypodermic Tubing, Cold Drawn Mechanical Tubing, A.S.M.E. Boiler Tubing.

May We Serve You?

THE BISSETT STEEL COMPANY, Cleveland, O.
The Tubing Specialists

ARMSTRONG

*Equip Your Machine Tools
with ARMSTRONG
Chrome-Vanadium Wrenches*

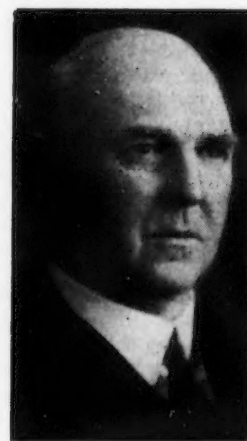
STANDARDIZE on lighter, thinner, stronger wrenches for machine wrenches, for automatic screw machines and other light, fast equipment with narrow set nuts and thin headed set screws. Their thinner heads assure a firm grip (without overhang). Their greater strength and longer handles permit a tighter set, give increased leverage. Their bright finish (chrome plate) makes them stand out—saves minutes lost in "fumbling" for the right tool.

STANDARDIZE on these lighter handier wrenches in the assembly department. They speed up work and reduce fatigue. There are types, sizes and matched sets for every need.

Write for Catalog and Prices



Armstrong Bros. Tool Co.
"The Tool Holder People"
309 N. Francisco Ave.
CHICAGO, U. S. A.
Eastern Warehouse and Sales:
199 Lafayette St., New York, N. Y.
San Francisco London



E. P. BURRELL

the design of an improved type of head which increased the adaptability of lathes, ways covers to protect the ways from chips and grit, and other improved features. He was also a pioneer in the building of lathes with heads that run entirely in oil. During his score and a half years with the company, Mr. Burrell directed the designing of all the large telescopes built by the company in the last 20 years, including the McDonald 82-in. reflector telescope that is being erected in western Texas. He developed a range finder for telescopes, a universal mounting for various types of telescopes used on battleships and aided in the design of a back sight for artillery.

A native of Hall, N. Y., Mr. Burrell was graduated from Cornell University in 1898 with a degree of

mechanical engineer in electrical engineering and the next year was given his master's degree in mechanical engineering. Case School of Applied Science, Cleveland, honored him last June with a degree of Doctor of Engineering. He was a member of the American Society of Mechanical Engineers and of the Cleveland Engineering Society.



JAMES H. STRATTON, mechanical engineer for the Wellman Engineering Co., died suddenly March 20, aged 75 years. He had been connected with the Wellman company and its predecessors 58 years. At the age of 17 he secured employment from the Webster, Camp & Lane Co., Akron, which in 1902 was consolidated with the Wellman-Seaver-Morgan Co., which later became the Wellman Engineering Co. At the time of the consolidation he was transferred to Cleveland as head of the construction department. Mr. Stratton was a member of the American Society of Mechanical Engineers and of the Cleveland Engineering Society, and a former vice-president of the latter society.



ARTHUR E. ARMINGTON, president Euclid Road Machinery Co., Euclid, Ohio, a Cleveland suburb, died suddenly March 18, aged 44 years, while aboard a steamer crossing the Pacific Ocean on a world cruise. He had been suffering from heart trouble and had started on the cruise because of his health. A native of Cleveland, Mr. Armington was the son of George A. Armington, president Euclid Crane & Hoist Co., parent company of the Euclid Road Machinery Co. He was graduated from Case School of Applied Science, Cleveland, in 1913 and was connected with the Euclid Crane & Hoist Co. from 1918 to 1926, when the Euclid Road Machinery Co. was formed. He was forced to give up the greater part of his business activities 18 months ago because of poor health.

Literature Available on \$200,000 Prize Contest

THE James F. Lincoln Arc Welding Foundation, which recently announced prizes totaling \$200,000 for best papers on welding practice in various fields, has made available a brochure outlining the rules and conditions governing the contest. This is a handsomely illustrated booklet of 48 pages. It will be sent free to any of our readers upon application to James F. Lincoln Arc Welding Foundation, P. O. Box 5728, Cleveland, Ohio.

Westinghouse Plants Raise Wages

PITTSBURGH, March 23. — Approximately 7500 workers at the Wilmerding and Swissvale, Pa., plants of Westinghouse Air Brake Co. and Union Switch & Signal Co.

have been granted a general wage increase. A minimum wage scale of 60c. an hr. for foundry laborers and a base rate of 58c. an hr. for labor in other departments has been established. A minimum rate of 45c. an hr. for women employees and a clerical straight 8 per cent increase was also covered in the announcement.

SPEED, WEIGHT and STAMINA

Mark these new MARVEL Heavy Duty High Speed Sawing machines. All ball-bearing construction, coupled with advance design principles, enable them to far out-cut, out-last, and out-run any other saws built.

With or without automatic bar push-up, they are today's fastest and most efficient cutting off machines for bar stock up to 10" x 10". Strictly multi-purpose tools, they will serve as general purpose hack saws and/or automatic production machines.

MARVEL No. 6
capacity 6" x 6".

MARVEL No. 9
capacity 10" x 10".

MARVEL No. 6A
with automatic Bar Push-Up
Capacity 6" x 6".

MARVEL No. 9A
with automatic Bar Push-Up
capacity 10" x 10".

Armstrong-Blum Mfg. Co.

"The Hack Saw People"

349 N. Francisco Ave., Chicago, U.S.A.



Write
for
Bulletin
600

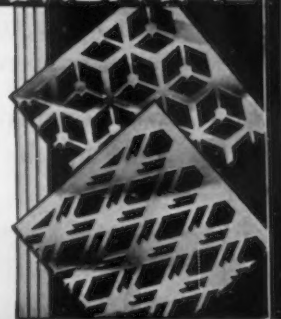


ANY
METAL
•
ANY
PERFORATION

INDUSTRIAL^a and ORNAMENTAL

Perforated Metals

Regardless of your problems, whether they demand the screening of very fine and treacherous materials such as minerals, chemicals and other similarly hard-to-screen products or your requirements include grilles for use where beauty is a major consideration, you will find H. & K. perforations particularly suited to your purpose. Send us your specifications and permit us to prove H. & K. standard of accuracy and lasting performance.



The Harrington & King Co.
PERFORATING

5657 Fillmore Street, Chicago, Illinois • 114 Liberty Street, New York, N. Y.

Carnegie-Illinois and SWOC Agreement a "Peace Pact"

PITTSBURGH, March 23.—Signed by five United States Steel subsidiary presidents and Steel Workers' Organizing Committee officials, last week, the union contract on behalf of employees belonging to the union between

United States Steel subsidiaries and the SWOC, has as its outstanding features a strongly worded "peace" provision. At a time when the hysteria of sit-down strikes has spread throughout the country, the following quotation from the steel

union contract is of interest: "Should any trouble of any kind arise in any plant, there shall be no suspension of work on account of such differences, but an earnest effort shall be made to settle such differences." (If necessary, eventual arbitration by a neutral umpire is provided.)

United States Steel subsidiary companies signing the peace pact included all the large units except American Bridge Co., with whom negotiations are to begin within the near future.

The principal points covered in the contract include union recognition on behalf of steel employees who are members of the SWOC. No discrimination on account of membership in the union will be made and the union also agrees not to intimidate or coerce employees into membership and not to solicit members on the corporation's time or property.

As mentioned a few weeks ago the 8-hr. day, 40-hr. week, with time and a half for overtime, has been established. The 10c. an hr. increase for all wage earners, granted to employee representatives for their constituents two weeks ago, has been extended to members of the SWOC.

Employee representatives at Carnegie-Illinois plants have attacked the SWOC contract as "freezing" wages of steel workers for one year. They recall the blast made by John L. Lewis last fall against the now defunct "cost of living" contract signed by some employee representatives last November, wherein he said the contract chained employees to the "economic wheel" of chance. In the latter a raise was to be granted in case living costs went beyond a certain point. Independent union leaders assert that the SWOC contract has no provision for the raising of wages in case inflationary tendencies cause a rapid rise in the cost of living.

Officials of the SWOC have stated that they have an "unwritten" understanding with the U. S. Steel officials that the contract can be reopened and negotiations begun in case the necessity for higher wages due to skyrocketing of living costs materializes. Carnegie-Illinois officials have neither affirmed nor denied this statement.

SWOC headquarters have sent blank contracts to several steel companies with a letter of transmittal, inviting the companies to sign up on behalf of their employees who are members of the union.

Vacations with pay, amounting to one week for employees with five years or more service, are covered

STEARNS Synchronized Automatic Combination Clutch-Brake



Compact, simplified design with the elimination of parts requiring replacement, powerful magnetic action, smooth operation with positive safety at all times.

Rugged, yet sensitive, combining substantial friction area to give maximum torque with greatest heat dissipation . . . minimum adjustment or replacement.

Capable of design in various combinations, this efficient magnetic clutch-brake unit will improve your product.

Stearns designs magnetic clutches and brakes as well as a full line of magnetic separators for purification, concentration and protection.

Our interesting Bulletin 100, the House of Magic, is yours for the asking.



Stearns High Duty A.C. or D.C. Magnetic Brake for motor application.

STEARNS MAGNETIC MFG. CO.

Formerly Magnetic Mfg. Co.

635 S. 28th St., Milwaukee, Wis.

in the contract. With other factors such as skill, physical fitness, etc., being equal, length of service shall govern cases of promotion or increase and decrease of working forces.

Disputes to Be Orderly

Machinery has also been set up for orderly and peaceful adjustment of all grievances and disputes. In case the grievance committee designated by the union, and a general manager of the plant cannot reach a satisfactory settlement of a question in dispute, the matter goes to the representatives of the national organization of the union and executives of the corporation. In case no decision is reached the matter is to be appealed to an impartial umpire to be appointed by mutual agreement of the union and the company with the decision of the umpire being final.

Other points covered in the contract are substantially in agreement with the general policy of United States Steel Corp. Provision is made for joint conferences between the company and the union to commence in Pittsburgh on Feb. 7, 1938, for the purpose of negotiating a new agreement. The contract also definitely sets July 4, Labor Day and Christmas as holidays with no regular production work except in cases of continuous operations. The agreement is to remain in full force and effect until Feb. 28, 1938.

Murray Cautions Workers

In the first official message to union steel workers since the beginning of the SWOC, Philip Murray, chairman of the SWOC, elaborated in detail on that particular part of the contract which calls for peaceful methods of negotiations. It is apparent that the intentions of the SWOC with regard to sit-down strikes are much more conservative than is the case with other groups associated with the CIO. The following is part of Mr. Murray's message pertaining to peaceful negotiations:

"With this contract now in effect, all members of our staff as well as local lodge officers and members, must have a full realization of their duties and responsibilities as union members under the contract. There must be full compliance with its terms. The contract establishes orderly methods for the adjustment of all disputes and grievances that may arise during the course of employment. There must under no circumstances be any strike or other cessation of work while such disputes or grievances are in the process of adjustment."

Meanwhile, employee representa-

tives in all Carnegie-Illinois Steel plants are going forward in their plans practically to make over their organization into an employee union having no connection with outside unions or the company. It is expected that the final details will be completed in the near future and put to a vote of the general body of employees who are favorable to the plan of employee representation. Some employee representatives who are also members of the SWOC have resigned their position as employee representatives

in a move to kill the plan of employee representation. There is no evidence at this time that the existence and activities of the employee representation plan has come to an end.

Pressure on Other Companies

Although no large independent steel companies have signed contracts with the SWOC, several smaller plants have either signed or have recognized the existence of the union, as far as their employees who belong to it are concerned. It

WEBBER GAGE BLOCKS
ARE NOW DISTRIBUTED
EXCLUSIVELY
BY
TAFT-PEIRCE

STYLE 9500
81-BLOCK SET, #81-B
(COMPLETE WITH CASE)
\$245.00

Including the following sizes:

One Ten-Thousandth series	.1001" - .1009" incl.	9 Blocks
One Thousandth series	.101" - .149" incl.	49 Blocks
Fifty Thousandths series	.050" - .950" incl.	19 Blocks
Inch series	1.800" - 4.000" incl.	4 Blocks



First industrial plant in this country to install gage blocks for the size-control of production, Taft-Peirce now assumes exclusive distributorship of Webber Gage Blocks—in low-cost sets that are equal or superior to any blocks manufactured to Class B tolerances.

All Taft-Peirce Webber Gage Blocks are guaranteed flat, parallel, and to size within eight millionths of an inch per block up to one inch, and per inch of length on larger blocks. They are made of a special grade of

finest alloy tool steel, carefully heat treated, and artificially seasoned by the exclusive method—developed by George Webber—to insure absolute stability and freedom from seasonal change. They check from 65 to 67 Rockwell—C Scale.

For salvaging and checking used blocks, Taft-Peirce maintains prompt service at reasonable rates, with readings guaranteed accurate to five millionths. Full information—with complete list of sets, sizes, and prices—for the asking. Write.



THE TAFT-PEIRCE MFG. CO.
WOONSOCKET RHODE ISLAND

is expected that large independent companies will be approached within the near future and there is little doubt that these companies will deal with the SWOC for those of their employees which the latter represents. Bethlehem Steel Corp. has already announced that it will meet at mutually convenient times with any persons claiming directly or through any organization to be representatives of any of its em-

ployees. Negotiations are going on in some of Bethlehem's plants with the SWOC on behalf of those employees belonging to the union. Apparently the method of negotiating by the SWOC with Bethlehem is different than the method followed with the United States Steel Corp. subsidiaries. SWOC representatives are carrying out negotiations with various Bethlehem Steel Corp. plants.

One test of the strength of the SWOC will come on April 1, after which time dues amounting to \$1 a month for men and 50c. a month for women will be collected. These dues had previously been suspended. On and after May 1 an initiation fee of \$3 for each steel worker will be charged. Those joining before May 1 are not subject to the initiation fee.

Following is the text of the agreement signed between the Carnegie-Illinois Steel Corp. and four other subsidiaries of the United States Steel Co. and the Steel Workers Organizing Committee:

This agreement dated March 17, 1937, between Carnegie-Illinois Steel Corp. (hereinafter referred to as the "corporation") and the steel workers' organizing committee on behalf of the members of the Amalgamated Association of Iron, Steel and Tin Workers of North America, or its successor (hereinafter referred to as the "union") employed by the corporation, made pursuant to and in supplement of Section 4 of the agreement of March 2, 1937, between said parties.

Section 1

It is the intent and purpose of the parties hereto that this agreement will promote and improve industrial and economic relationships between those employees who are members of the union and the corporation, and to set forth herein the basic agreement covering rates of pay, hours of work and conditions of employment to be observed between the parties hereto.

It is understood and agreed that this agreement pertains only to members of the union employed in the corporation's steel manufacturing and by-product coke plants.

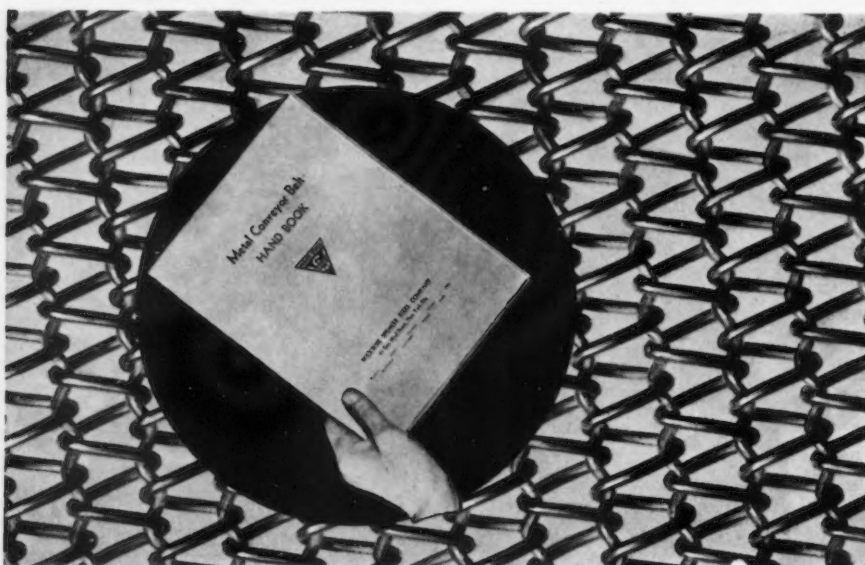
The term "employee" as used in this agreement shall not include foremen, assistant foremen or supervisors in charge of any classes of labor, or watchmen, or any salaried employees.

Section 2—Recognition

The corporation recognizes the union as the collective bargaining agency for those employees of the corporation who are members of the union. The corporation recognizes and will not interfere with the right of its employees to become members of the union. There shall be no discrimination, interference, restraint or coercion by the corporation or any of its agents against any members because of membership in the union. The union agrees not to intimidate or coerce employees into membership and also not to solicit membership on corporation time or plant property.

Section 3—Wages

Effective March 16, 1937, there shall be an increase in wages of ten (10c.) cents an hour on all rates which are at present four dollars and twenty cents (\$4.20) a day, or a minimum for this classification of five (\$5) dollars a day of eight (8) hours. Such classifications now receiving less than four dollars and twenty cents (\$4.20) a day or less than fifty-two and one-half cents (52½c.) per hour, shall be increased ten (10c.) cents per hour. There shall be an increase of ten (10c.)



Each WISSCO belt built to do a particular job. Send for the Handbook . . .

WISSCO
CONVEYOR BELTS

it tells the whole story.

WICKWIRE SPENCER STEEL COMPANY

41 East 42nd St., New York, N. Y.

BUFFALO
WORCESTER

SAN FRANCISCO
CHICAGO

NORTHERN CRANES AND HOISTS
SERVE EVERY INDUSTRIAL NEED



NORTHERN ENGINEERING WORKS

NEW YORK CHICAGO CHENE AND ATWATER STS. DETROIT, MICH. PITTSBURGH WINDSOR, ONT.

per hour in all other hourly rates, and an equivalent increase in all tonnage and piece-work rates which will net under normal expected earnings an increase of not less than eighty (80c.) cents per day of eight (8) hours.

Section 4—Hours of Works

Effective March 16, 1937, there shall be established at eight (8) hour day and a forty (40) hour week. Time and one-half shall be paid for all overtime in excess of eight (8) hours in any one day or for all overtime in excess of forty (40) hours in any one week.

A day may be a calendar day or any twenty-hour-hour period, and a week may be a calendar week or any five (5) regular eight-hour turns on consecutive days, followed by a forty-eight-hour rest period, at the option of the corporation.

An employee who is a member of the union, shall not be paid both daily and weekly overtime for the same hours so worked.

Section 5—Vacations

Each employee, who is a member of the union and who, prior to July 1, 1937, was continuously in the service of the corporation five (5) years or more (continuity of service to be based on United States Steel and Carnegie Pension Fund rules for service continuity) shall receive one week's vacation with pay, such vacation to be taken in a single period. Those who are granted vacations will be paid on their average rate of earnings per hour for the two pay periods immediately preceding their vacation. The total hours of vacation pay will be the average hours they worked per week during that period, but not less than forty hours nor more than forty-eight hours.

Vacations will so far as possible be granted at time most desired by employees, but the final right to allotment of vacation period is exclusively reserved to the corporation in order to insure the orderly operation of the plants.

Section 6—Seniority

It is understood and agreed, however, that in all cases of promotion or increase, or decrease of forces, the following factors shall be considered, and where factors (b), (c), (d), and (e) are relatively equal, length of continuous service shall govern.

- (a) Length of continuous service.
- (b) Knowledge, training, ability, skill and efficiency
- (c) Physical fitness.
- (d) Family status, number of dependents, etc.
- (e) Place of residence.

Section 7—Adjustment of Grievances

Should difference arise between the corporation and the union or its members employed by the corporation as to the meaning and application of the provisions of this agreement, or should any local trouble of any kind arise in any plant, there shall be no suspension of work on account of such differences, but an earnest effort shall be made to settle such differences immediately in the following manner:

First—Between the aggrieved employee, who is a member of the union, and the foreman of the department involved;

Second—Between a member or mem-

bers of the grievance committee, designated by the union, and the foreman and superintendent of the department;

Third—Between a member or members of the grievance committee, designated by the union, and the general superintendent or manager of the plant;

Fourth—Between the representatives of the national organization of the union, and the representatives of the executives of the corporation; and

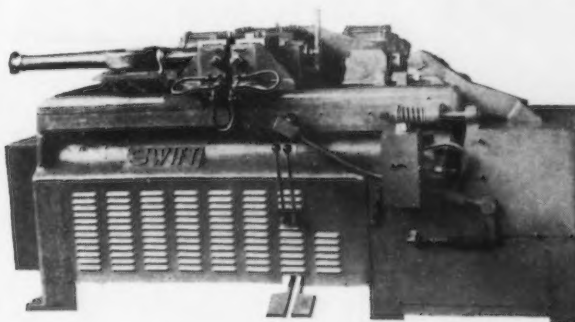
Fifth—In the event the dispute shall

not have been satisfactorily settled, the matter shall then be appealed to an impartial umpire to be appointed by mutual agreement of the parties hereto. The decision of the umpire shall be final. The expense and salary incident to the services of the umpire shall be paid jointly by the corporation and the union.

Specified periods shall be agreed upon between the grievance committee and the general superintendent or manager of each plant for the presen-

SWIFT NO. 91-AA 500 KVA FLASH WELDER

Swift No. 91-AA 500 KVA Flash Welder welding forged flanges 3/16" wall thickness to



axle housing 5/32" wall

thickness. Actual time

welding cycle 2 seconds.

Takes up 3/16" varia-

tion in length of stock

and welds to uniform

length. Suitable for

high speed production

welding on parts up to

2 1/2 square inch section.

SWIFT ELECTRIC WELDER CO., 6560 EPWORTH BLVD., DETROIT

Welding machines which are hand, hydraulic, cam or air operated, including the following types: SPOT, SEAM, PROJECTION, FLASH, FLUE, AND GUN WELDING UNITS

For all
Purposes
LESCHEN
WIRE ROPE

ESTABLISHED
1857

A. Leschen & Sons Rope Co.

5909 Kennerly Avenue

ST. LOUIS, MO.

New York 87 to 90 West Street

Chicago 810 W. Washington Blvd.

Denver 1554 Wazee Street

San Francisco 520 Fourth Street



Round Strand
Flattened Strand
"P. F. S."

Non-Rotating

Preformed

Steel Clad

Locked Coil

Regular Lay

Lang's Lay

Hemp Center

Wire Rope Center

Metallic Core

Seale - Filler Wire

Warrington

tation of grievances hereunder. Provided, however, that matters pertaining to discharges or other matters that cannot reasonably be delayed until the time of the next regular meeting may be presented at any time in accordance with the foregoing provision.

The grievance committee for each plant shall consist of not less than three employees of that plant, and not more than ten (10) such employees, designated by the union, who will be afforded such time off, without pay, as may be required.

First, to attend regularly scheduled committee meetings, and

Second, to attend meetings pertaining to discharges or other matters which cannot reasonably be delayed until the time of the next regular meeting.

Third, any member of the grievance committee shall have the right to visit departments other than his own at all reasonable times for the purpose of transacting the legitimate business of the grievance committee after notice to and permission from his department superintendent or his designated representative.

The actual number of members of the grievance committee at each plant shall be mutually agreed upon between the general superintendent or manager of the plant and the union, and in no case shall there be more than one member in any department.

Section 8—Management

The management of the works and the direction of the working forces, including the right to hire, suspend or discharge for proper cause, or transfer and the right to relieve employees from duty because of lack of work, or for other legitimate reasons, is vested exclusively in the corporation, provided that this will not be used for purposes of discrimination against any member of the union.

Section 9—Discharge Cases

In the event a member of the union shall be discharged from his employment from and after the date hereof, and he believes he has been unjustly dealt with, such discharge shall constitute a case arising under the method of adjusting grievances herein provided.

In the event it should be decided under the rules of this agreement that an injustice has been dealt the employee with regard to the discharge, the corporation shall reinstate such employee and pay full compensation at the employee's regular rate for the time lost. All such cases of discharge shall be taken up and disposed of within five (5) days from the date of discharge.

Section 10—Safety and Health

The corporation shall continue to make reasonable provisions for the safety and health of its employees at the plant during the hours of their employment. Protective devices, wearing apparel and other equipment necessary to properly protect employees from injury shall be provided by the corporation in accordance with the practice now prevailing in each separate plant. Proper heating and ventilating systems shall be installed where needed.

Section 11—Individual Wage Rates

Where alleged inequalities in wage rates prevail, the matter may be taken up for local plant adjustment and settlement made on a mutually satisfactory basis.

Section 12—Future Conferences

Joint conferences between representatives of the corporation and of the union shall commence in Pittsburgh, Pa., on Feb. 7, 1938, for the purpose of negotiating an agreement with regard to wages, hours and working conditions, to take effect upon the expiration of this agreement.

Section 13—Holidays

The following days shall be considered holidays, during which days there shall be no regular production work, except in cases of continuous operations, on:

July 4, Labor Day and Christmas.

Section 14—Termination Date

This agreement shall remain in full force and effect until Feb. 28, 1938.



The **"RIVITOR"**
Feeds and Sets **SOLID Rivets**
Automatically

*T*HE WORK is placed over the locator in the anvil. The rivet is fed automatically into the jaws which are carried down by the ram. The head is formed underneath the work. A gain in strength from 10% to 19% is accomplished (over that of other type rivet joints.)

May we send you literature describing further the many advantages of this machine?

THE TOMKINS-JOHNSON CO.
628 N. Mechanic St., Jackson, Michigan
European Office
GASTON E. MARBAIX, Ltd., Vincent House,
Vincent Square, London, S. W. 1, England

Tool Steel

Modern Machines
— capable of increased production—should not be handicapped by tools that will not stand up under the higher speeds.

We can quickly furnish the right steel for the most exacting requirements. Talk it over with one of our representatives.

NEW YORK 745 Washington St. Tel. CHelsea 3-5313 Teletypewriter NY-1-146
There's a distributor near you
MILNE & CO.
CHICAGO PITTSBURGH NEW ORLEANS DETROIT
BOSTON 915 Oliver Bldg. Tel. HANcock 4999 Teletypewriter BOS-270

J. & L. Workers Consider Negotiations For a Further Wage Increase

PITTSBURGH March 23.—Opening up the question of higher wages less than a week after the establishment of the \$5 day, 36 employee representatives of the Jones & Laughlin Steel Corp. have voted unanimously to reopen wage negotiations with the steel company's officials. They are polling all workers to determine whether the pay demand which will be given to management late this week will be for a 15 per cent wage increase or a flat \$1 a day raise which would establish common labor at \$6 a day.

Dissatisfaction over the 40-hr. week with time and a half for work over 40 hours accounts for the new wage request, according to company union leaders. The criticism is based on the assumption that new workers will be hired in order that the employees may be placed on a 40-hr. week and they feel that steel labor, now getting \$25 for a five-day week on jobs for which additional men have been hired, compares with \$25.20 on a six-day week prior to the wage adjustment.

A Department of Labor hearing on charges of coercion and intimidation of an employee by Jones & Laughlin Steel Corp. officials has been ordered held in Pittsburgh April 1. The employee, Paul Normile, John L. Lewis union supporter at Jones & Laughlin's Aliquippa works, recently appealed to Secretary of Labor Frances Perkins after he was ousted by his constituents. Normile has alleged that the company sponsored the petition for his recall as an employee representative of the Aliquippa works and that it intimidated and coerced his fellow employees who signed the petition. His allegations are denied by both Jones & Laughlin officials and leaders of the employee representatives plan of collective bargaining. Mr. Normile has been a leader in seeking to win company union representatives over to the Lewis organization.

Jackson Gear Co. To Start April 1

JACKSON GEAR CO., Pittsburgh, will commence operations April 1 and will manufacture a complete line of all types of gears for general and industrial use. Executives of this new company will be John J. Jackson, J.

Harper Jackson and Stanley J. Jackson.

John J. Jackson, one of the founders of the Pittsburgh Gear Machine Co., served as vice-president of the latter for 21 years. J. Harper Jackson has been with the Pittsburgh Gear Machine Co. since

1919 as secretary and sales manager and during the last five years has been treasurer of the American Gear Manufacturers Association. Stanley J. Jackson, who will be production manager for the Jackson Gear Co., was connected with the Pittsburgh Gear Machine Co.

The American Institute of Bolt, Nut and Rivet Manufacturers has moved its offices to 1550 Hanna Building, Cleveland.



There's
DOLLARS and "SENSE"
LOGIC in SPECIFYING
WYCKOFF
COLD FINISHED
STEELS

LOGICAL because Wyckoff Cold Drawn Steels enable you to reduce machining operations and thus cut dollars from production costs and add them to profits. It is the one kind of steel that meets the most exacting standards as to accuracy of size and shape . . . uniformity of cross section . . . straightness and smooth finished surface—a refined steel that combines precise physical and chemical analyses.

In addition to the standard Wyckoff Rounds, Squares and Hexagons, we have a most complete line of special shapes including w-i-d-e Flats up to 12" x 2".

WYCKOFF DRAWN STEEL CO.
General Offices: First National Bank Building, Pittsburgh, Pa.
Mills at Ambridge, Pa. and Chicago, Ill.
Manufacturers of Carbon and Alloy Steels
Turned and Polished Shafting Turned and Ground Shafting
Wide Flats up to 12" x 2"

The Stake of the Public Utilities In Better Drive Methods

(CONTINUED FROM PAGE 43)

figures for 1936 are not yet available, but it is expected that they will exceed those of 1935.

But the utilization of all the existing interconnections together would just about make it possible to drain from non-manufacturing districts enough energy to supply the expected increase in industrial demands during 1937; with the result that the 90 per cent of the generating capacity represented in these interconnected systems would all be in use during manufacturing working hours at a use factor which leaves nothing for emergencies.

With regard to the purchase of power by the utilities, it should be noted that during 1936 they bought from industrial manufacturers operating their own plants, from municipal stations and various other

sources, some two billion kw. hr. of energy; and from across international borders (Canada and Mexico) about one billion kw. hr.; or somewhat less than 2 per cent of the energy consumed. The increase in industrial recovery makes it unlikely that more than two billion kw. hr. can be purchased by the utilities within the country this year. It is possible through present connections to purchase about about five billion kw. hr. from Mexico and Canada; and possibly three times that amount if additional interconnecting lines are built.

Summary

Present industrial demands are taxing the capacity of the utilities now; if industrial recovery progresses as at present the utilities will have to resort to emergency

measures to supply the 1937 demands.

In the meantime, utility engineers, fully aware that inefficient methods of using electrical energy in industrial plants are causing both low power factor and unduly high demand, are using every means available to show the industrial customer how he can increase the efficiency of his application of purchased power.

Low power factor of industrial plants ties up a great deal of generating capacity in the central station which could be put to effective use if the power factor were increased. Likewise a plant which operates at a certain average electrical load most of the day, but for a few minutes every so often requires a much higher amount of energy, also ties up generating capacity unproductively. The utilities have found that the imposition of penalties on the customer for low power factor and high demand does not adequately compensate them for the loss of the energy sales which could be made if power factor were uniformly high and if peak demands were leveled. The answer, they have found, is not in increased penalties, but in elimination of the cancers. And by means of practical education, resulting in savings to the customer and larger net profits to the utilities, bit by bit, in plant after plant, improved power transmission and application methods are releasing for productive use a generating capacity in the central stations capable of putting into service between 10 billion and 15 billion kw. hr. of additional energy per year.

Here, in this educational campaign, as much as in the construction of additional generating capacity, and more than in the additional interconnection of stations or in the increased purchase of power from domestic or foreign sources, lies the answer to the immediate question, "Where is the additional energy coming from which will be required to meet the 1937 industrial demands?"

International Harvester Co. reports for fiscal period ended Oct. 31, 1936, net profit of \$29,760,000 after all deductions, including \$2,000,000 provision for approximate Federal surtax on undivided profits. Sales of farm implements, tractors, motor trucks, etc., in the United States, Canada and foreign countries totaled \$254,933,872.

New 1307 WELDIT MODEL W WELDING TORCH with BUILT-IN Automatic GASAVER

SAVES fuel—reduces welding cost—eliminates idle flame hazards. As operator grasps handle of torch placing thumb on lever in natural position, full welding flame is instantly on. Release thumb, and automatically flame is reduced to pilot size. No re-lighting or re-adjusting flame between welds. Weighs only 13 ounces, no mechanism in handle, fuel control valves are conveniently located in front of torch handle. Actual savings will soon pay for torch.

Literature on request.

WELDIT ACETYLENE CO.
641 BAGLEY AVE. DETROIT, MICH.

Test this WELDING TORCH **Free** FOR TWO WEEKS IN YOUR PLANT

Automatic LEVER CONTROL GASAVER

Automatically ON IN USE

Automatically OFF NOT IN USE

Walsh-Healey Act Too Narrowly Interpreted, Says House Committee

WASHINGTON, March 23.—The House Committee on Appropriations, in a report just made to the House, takes critical issue with the Department of Labor on its construction of the open market purchase provision of the Walsh-Healey Government Contracts Act and recommends that, before any money be appropriated for administration of the law, a ruling of the Comptroller General should be obtained on this point.

The committee, reporting on the State, Justice, Commerce and Labor Appropriation Bill, says it is its feeling that the legislative intent has been too narrowly defined in the construction that has been placed by the Solicitor of the Labor Department on the open purchase section. Restrictive interpretation of the law is attributed to Secretary of Labor Perkins.

The committee also concluded that the projected new division for the administration of the act is too elaborate and accordingly reduced the budget estimates by approximately \$55,000, including \$5,000 for travel.

By the terms of the Walsh-Healey Act, purchases that may be made in the open market are exempted from its operation. In construing this exception in the law, the committee points out, the solicitor of the Department of Labor has ruled that the limitation runs to all commodities or materials for which the purchase contract must, by law, be negotiated as a result of competitive bidding.

"The effect of this decision is to give a narrow construction to the terms of the exception by limiting the operation thereof to purchases that may be made by the Government under the terms of existing law in the open market, rather than extending the operation of the exception to purchases that may be bought by anyone under established custom in the open market," the report states. "If the latter construction had been placed upon the words of the act the field in which the statute would operate would be considerably narrowed."

It was pointed out that it was testified that whereas between 3500 and 4000 contracts are now covered by the act, such a construction of the law would reduce the number of contracts to be considered to about 500.

It is expected that the Walsh-Healey Act will be amended so as to reduce from \$10,000 to \$2,000 the amount of contracts which will be exempted under its terms.

*Set Screws
WITH ALL
STANDARD
POINTS . . .
in all sizes*

Address the Factory or Our Nearest Warehouse:

CHICAGO, 726 W. Washington Blvd.
PHILADELPHIA, 12th & Olive Sts.
NEW YORK . . . 47 Murray Street
LOS ANGELES, 1015 East 16th St.



• Flat, Cone, Dog, Cup, Round—name your type of Set Screw needed and we will have it in stock in the size and quantity you require, or we will make it without delay. Cleveland Cap and Set Screws have established an enviable record for constant quality—a record which has helped our company to enjoy a healthy growth during the two past decades. Check them for accuracy of thread and other important features. You will find the quality uniformly high. All Set Screws are case hardened by the most modern method. Catalog "D" on request. THE CLEVELAND CAP SCREW CO., 2929 East 79th St., Cleveland, Ohio.

CLEVELAND CAP SCREWS
SET SCREWS • BOLTS AND NUTS

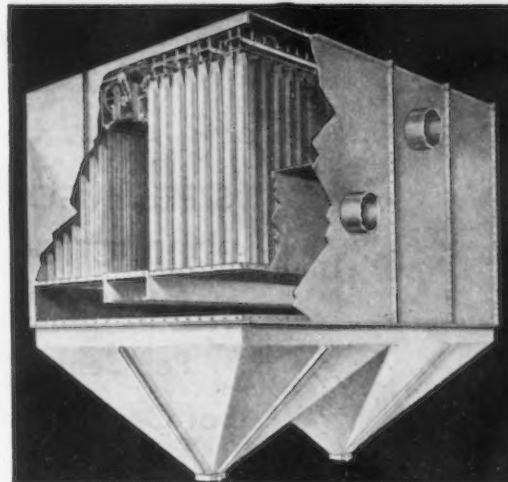
*dustube Dust
Collectors make
a hit with every
plant operator!*



One always excels! In every sport there's a Ruth, a Tilden, or a Dempsey standing preeminently in their field—and the same holds true in equipment—it's the American dustube Collector for dust suppressing!

The dustube Collector is ideally applied in all industries having a dust hazard. For suppressing dust in rooms and buildings and for improving air conditions at specific machines, or dust creating operations.

No matter what the reason for dust suppression may be—eliminating the health hazard—reducing the dust nuisance to the community—or recovering a valuable dust product—the American dustube Collector is ideally



applied. It is made in sizes and types suitable to every operating condition.

dustube features include most advanced engineering design, the result of long experience in making dust arresting equipment—easy installation—long lasting cylindrical dustubes—a simple, highly efficient shaker device—simple installation, removal and inspection of tubes and high efficiency operation.

American Dust Collector Engineers are available to survey your plant and make recommendations on the size and type of dustube unit best suited your needs—a request for consultation implies no obligation.

Send for Catalog No. Twenty-Two on "American dustube Dust Control."

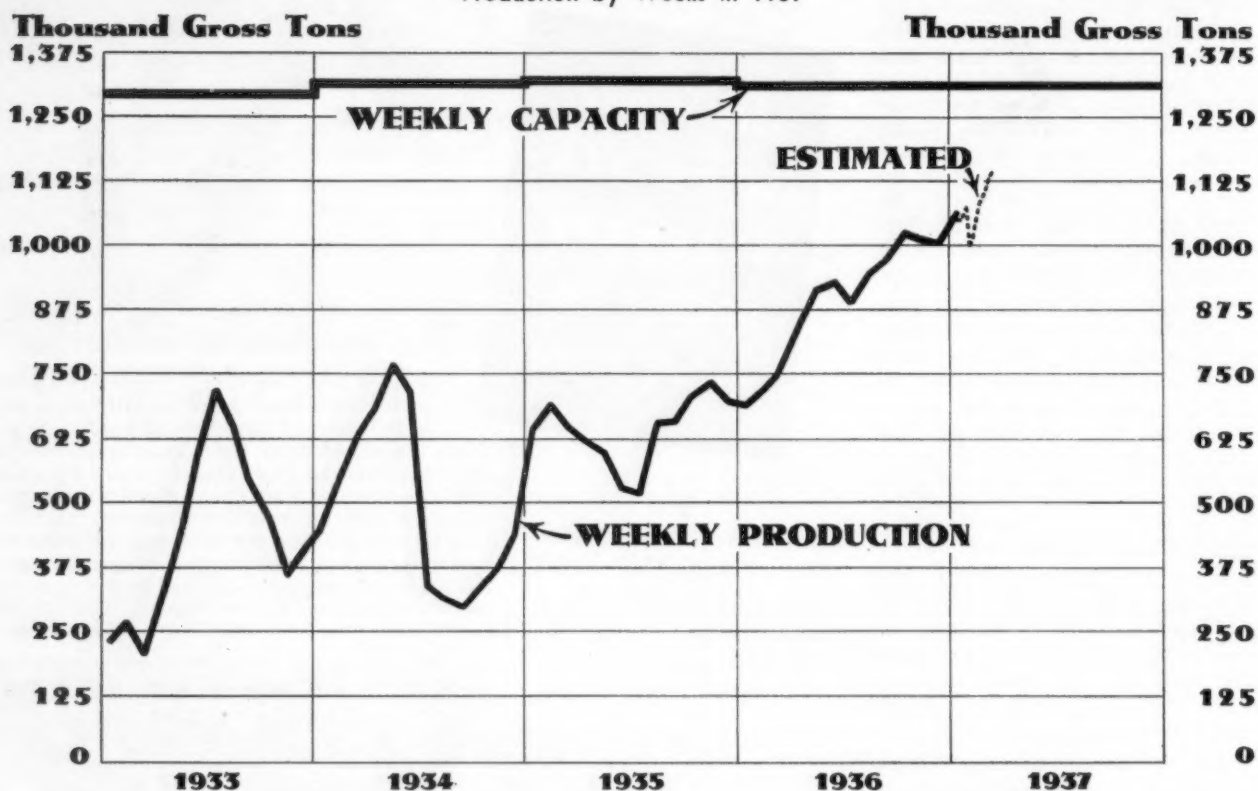
THE AMERICAN FOUNDRY EQUIPMENT COMPANY
510 S. Byrkit St., Mishawaka, Indiana



Makers of Abrasive Blast Equipment for Every Metal Cleaning Operation—dustube Dust Collectors, Sand Cutters, and other Foundry Equipments

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week
Pittsburgh	93.0	91.0
Chicago	83.5	82.0
Valleys	88.0	87.0
Philadelphia	60.0	60.0
Cleveland	82.0	81.0
Buffalo	91.0	91.0
Wheeling	99.0	99.0
Southern	77.5	80.0
Ohio River	82.0	80.0
Western	91.5	91.5
St. Louis	88.0	*88.0
Detroit	100.0	100.0
Eastern	98.0	98.0
Aggregate	90.0	89.0

* Revised.

Weekly Booking of Construction Steel

FROM THE IRON AGE

	Mar. 23, 1937	Mar. 16, 1937	Week Ended Feb. 23, 1937	Mar. 24, 1936	Year to Date 1937	1936
Fabricated structural steel awards	18,900	17,900	12,350	15,150	288,045	270,615
Fabricated plate awards	2,667	2,940	870	8,530	36,002	84,455
Steel sheet piling awards	0	0	2,020	700	14,655	14,745
Reinforcing bar awards	2,120	3,045	5,200	3,000	39,070	110,055
Total Lettings of Construction Steel	23,687	23,885	20,440	27,380	377,772	479,870

...SUMMARY OF THE WEEK...

... Steel production up to 90 per cent as backlogs show further large increase.

o o o

... March bookings in excess of those of December and January, previous peak months.

o o o

... Large inquiries for railroad equipment; Granite City, Ill., made a basing point.

APPREHENSION in Government and economic circles because of the rapid rise of wages and prices, together with growing concern over spreading labor unrest, has had no discernible effect upon steel production or incoming business, which are mounting to peaks that compare with the best records of 1929. In the Pittsburgh district, for example, the steel ingot rate has risen to 93 per cent, the highest since the World War, while for the country at large this week's production is estimated at 90 per cent.

Heavy backlogs for the second quarter in nearly all products virtually assure the continuance of the present rate, or close to it, during that period. Indeed, there is a possibility of further slight increases in output in some districts, as open-hearth furnaces that have not been in operation since 1930 are being put in readiness. Aside from the lack of serviceable steel-making capacity, the increasing shortage of pig iron is the most important restriction upon higher steel output.

March bookings of steel products will exceed those of February by fully 50 per cent and by smaller margins will top those of December and January, the two previous peak months of this movement. In sheets, most mills are booked solid for the second quarter, and a few have taken business for shipment as far ahead as late August, with price at time of delivery to apply. On some grades of sheets deliveries are extended to 23 weeks.

Seldom, if ever, in the history of the steel industry, not excluding 1920 and 1929, has there been so decidedly a sellers' market. Many mills are actually refraining from the solicitation of business, and buyers are going to the mills. A common occurrence is the arrival of buyers at the home offices of steel companies to plead for preferential treatment. In such circumstances steel companies are picking and choosing their orders

and their customers to a degree that has rarely been equaled.

IN view of the fact that steel companies do not yet know whether recent price advances will fully compensate for rising costs, including wage increases, new business is being accepted more cautiously than was the case in December, upon the occasion of the previous general price advance. It is the aim to clear the books before June 30 of all tonnage taken at second-quarter prices, whereas some of the lower priced business booked in December will run over into the second quarter, despite the best efforts of the mills to ship it by March 31. A particular instance of the present attitude of steel companies is on identified construction projects, on which stringent restrictions apply. Concrete reinforcing bar distributors, for example, are not being given coverage on specific projects if the material is to be taken into their stock, as was commonly done in the past.

With substantial second-quarter production assured, attention centers on prospects for the third quarter. Prominent among new projects is a large volume of inquiry for railroad equipment. Around 11,000 freight cars of various types have been inquired for in the past week, and scarcely any of these can be built before midsummer. The Southern Railway seeks 5600, the Chesapeake & Ohio and Erie, 1000 each, the Seaboard, 500 to 1000, the Soo Line, 750. The Atlantic Coast Line, 430 or more, the Central of Georgia, 600, the Pacific Fruit Express, 500, and the Lehigh & New England, 100. These are believed to be only the forerunner of a large secondary buying movement in equipment, which may be supplemented by further purchases of rails. A pipe line from Texas to Chicago, requiring 125,000 tons or more of pipe, is another prospect, though not yet definite. Construction work is taking more structural steel, lettings this week totaling 19,000 tons and new inquiries are about 24,000 tons.

Despite last week's reduction in automobile output, owing to the Chrysler and Hudson strikes, shipments of steel to other automobile plants are heavy. Large orders have been placed by General Motors for second-quarter steel requirements. Demand for steel is particularly active from manufacturers of refrigerators, stoves and other household equipment.

THE first important extension of steel basing points since the adoption of the NRA code has been announced by the Granite City Steel Co., which establishes prices, effective April 1, at Granite City, Ill., on tin plate and sheets 10c. per 100 lb. above the Gary, Ind., base, which will bring savings of \$1.80 per ton to St. Louis district consumers, who have been charged the full freight rate of 22c. per 100 lb. from Gary. Other steel companies shipping to the St. Louis area will be obliged to lower their delivered prices accordingly.

THE Lake Superior ore movement is expected to start early in April, and predictions are made that fully 60,000,000 tons will be brought down this year by water. Some independent producers have withdrawn from the market, having contracted for all of the ore they will be able to mine and ship. The first open market purchase at the new prices, amounting to 315,000 tons, has been made by the Ford Motor Co. Some merchant blast furnaces, long idle, are preparing to go into blast as soon as they can obtain ore. But meanwhile, the supply of beehive coke may be reduced through foreign purchases, offers having been made at higher than domestic prices. Meanwhile, pig iron is virtually being rationed, as steel com-

panies, which are the principal suppliers in the merchant market, are caught with short stocks owing to their own large requirements. Some pig iron sellers are out of the market for the second quarter.

Steel-making costs are further added to by advances in prices of refractories, effective April 1. Also, the rise in scrap prices continues. At Cleveland, steel scrap went up \$1 a ton, and 50c. increases occurred at Pittsburgh, Chicago and Philadelphia, bringing THE IRON AGE scrap composite up to \$21.75. Meanwhile, the steel labor situation is agitated again by the demand by Jones & Laughlin workers for a \$6 a day minimum.



...PITTSBURGH...

... *Mills operating at 93 per cent, the highest rate since War days.*

... *Only factors restricting output are lack of steel-making capacity and pig iron.*

... *Substantial backlogs for second quarter assure continuance of high rate.*

PITTSBURGH, March 23. — Tremendous backlogs, coupled with daily pressure for earlier deliveries, are causing producers to force operations to the utmost, with the result that the Pittsburgh district ingot output has moved up two points to 93 per cent of capacity. With little chance of this rate receding during the present quarter and with a possible chance that it may even go higher, steel operations in this district for the first quarter are the largest since War days.

The only factors holding down production are lack of steel-making capacity and pig iron, but some mills are hastily repairing furnaces that have not been in operation since 1930.

Meanwhile, for the first time in many years, the last month of the first quarter finds a substantial tonnage of business at second quarter prices on mill books. Especially is this true with regard to sheets, strip and wire products. Orders for other finished products, such as bars and shapes, at new prices,

although in less volume than a month ago, are greater than mills anticipated. Backlogs on hot rolled bars are six to eight weeks, on plates eight to 10 weeks and on sheets 16 to 22 weeks, depending on the grade. Deliveries are becoming so extended that many customers are rapidly getting on the order books in order to insure delivery of material when needed. The presence of large tonnages booked for identified projects, the restrictions on specifications from contract customers, and the fair volume of business at new prices preclude much change in delivery difficulties for some time to come.

Tin plate specifications are in excellent volume, with operations at 100 per cent.

The raw material markets continue firm, with No. 1 steel scrap up 50c. a ton. Refractory prices will be advanced effective April 1 and reflect a \$6 increase for fire clay and silica brick and a \$2 increase for chrome and magnesite brick.

The beehive coke market is ex-

ceptionally strong, and foreign inquiry has now entered this market with offerings being made at higher than current quotations for beehive furnace coke.

Pig Iron

Foreign inquiries, prevalent in this district recently, are being ignored by local producers, who are busy taking care of their regular customers. In some cases foreign representatives are endeavoring to find out what price local producers would ask in case they were interested in sales. Demand is at a high rate and with advancing scrap prices consumers are increasing iron content in melts as high as possible consistent with quality and ability to get delivery. Stocks at producers' plants are abnormally low. With steel plants and steel foundries operating at practical capacity, an extremely tight market for steel-making iron is in prospect.

Semi-Finished Steel

Customers with first quarter contracts are being kept within normal bounds by producers and, where rolling schedules are heavy, tonnages are being allotted. Attempts to pile up low priced orders are being checkmated by producers, who are closely scrutinizing all specifications applying against contracts. Demand continues ahead of production, with no evidence of large consumers' stocks. Bookings at the new prices are in good volume, although aggregate tonnages are below those of periods previous to the price advance. Customers are loath to give up delivery positions, hence prices have become a secondary matter. The piling up of unsatisfied foreign inquiries precludes any prolonged quietness in domestic buying.

Bolts, Nuts and Rivets

Backlogs have increased considerably owing to specifications from contract customers. Suspensions from affected auto plants will

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous:
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Mar. 23, 1937	Mar. 16, 1937	Feb. 24, 1937	Mar. 24, 1936
Rails, heavy, at mill.....	\$42.50	\$42.50	\$39.00	\$36.37 1/2
Light rails, Pittsburgh.....	43.00	43.00	38.00	35.00
Rerolling billets, Pittsburgh.....	37.00	37.00	34.00	28.00
Sheet bars, Pittsburgh.....	37.00	37.00	34.00	28.00
Slabs, Pittsburgh.....	37.00	37.00	34.00	28.00
Forging billets, Pittsburgh.....	43.00	43.00	40.00	35.00
Wire rods, Nos. 4 and 5, P'gh.....	47.00	47.00	43.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	2.10	2.10	1.80	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	2.45	2.45	2.20	1.85
Bars, Chicago.....	2.50	2.50	2.25	1.90
Bars, Cleveland.....	2.50	2.50	2.25	1.90
Bars, New York.....	2.78	2.78	2.55	2.20
Plates, Pittsburgh.....	2.25	2.25	2.05	1.80
Plates, Chicago.....	2.30	2.30	2.10	1.85
Plates, New York.....	2.53	2.53	2.33	2.09
Structural shapes, Pittsburgh.....	2.25	2.25	2.05	1.80
Structural shapes, Chicago.....	2.30	2.30	2.10	1.85
Structural shapes, New York.....	2.5025	2.5025	2.3025	2.06 1/4
Cold-finished bars, Pittsburgh.....	2.90	2.90	2.55	2.10
Hot-rolled strips, P'gh.....	2.40	2.40	2.15	1.85
Cold-rolled strips, Pittsburgh.....	3.20	3.20	2.85	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	3.15	3.15	2.80	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	3.25	3.25	2.90	2.50
Sheets, galv., No. 24, P'gh.....	3.80	3.80	3.40	3.10
Sheets, galv., No. 24, Gary.....	3.90	3.90	3.50	3.20
Hot-rolled sheets, No. 10, Pittsburgh.....	2.40	2.40	2.15	1.85
Hot-rolled sheets, No. 10, Gary.....	2.50	2.50	2.25	1.95
Cold-rolled sheets, No. 20, Pittsburgh.....	3.55	3.55	3.25	2.95
Cold-rolled sheets, No. 20, Gary.....	3.65	3.65	3.35	3.05
Wire nails, Pittsburgh.....	2.75	2.75	2.50	2.10
Wire nails, Chicago dist. mill.....	2.80	2.80	2.55	2.15
Plain wire, Pittsburgh.....	2.90	2.90	2.60	2.30
Plain wire, Chicago dist. mill.....	2.95	2.95	2.65	2.35
Barbed wire, galv., Pittsburgh.....	3.40	3.40	3.05	2.50
Barbed wire, galv., Chicago dist. mill.....	3.45	3.45	3.10	2.55
Tin plate, 100-lb. box, P'gh*.....	\$4.85	\$4.85	\$4.85	\$5.25

* Practically the equivalent of previous quotation owing to new method of quoting, effective Jan. 1, 1937.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	Mar. 23, 1937	Mar. 16, 1937	Feb. 24, 1937	Mar. 24, 1936
No. 2 fdy., Philadelphia.....	\$25.76	\$25.76	\$23.76	\$21.3132
No. 2, Valley furnace.....	24.00	24.00	22.00	19.50
No. 2, Southern Cin'ti.....	23.69	23.69	21.69	20.2007
No. 2, Birmingham.....	20.38	20.38	18.38	15.50
No. 2, foundry, Chicago*.....	24.00	24.00	22.00	19.50
Basic, del'd eastern Pa.....	25.26	25.26	23.26	20.8132
Basic, Valley furnace.....	23.50	23.50	21.50	19.00
Malleable, Chicago*.....	24.00	24.00	22.00	19.50
Malleable, Valley.....	24.00	24.00	22.00	19.50
L. S. charcoal, Chicago.....	30.04	30.04	27.54	25.2528
Ferromanganese, seab'd, car-lots.....	80.00	80.00	80.00	75.00

† This quotation is subject to a deduction of 38c. a ton for phosphorus content of 70 per cent or higher.

* The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	Mar. 23, 1937	Mar. 16, 1937	Feb. 24, 1937	Mar. 24, 1936
Heavy melting steel, P'gh.....	\$23.75	\$23.25	\$20.75	\$15.75
Heavy melting steel, Phila.....	20.25	19.75	18.75	13.75
Heavy melting steel, Ch'go.....	21.25	20.75	20.25	14.75
Carwheels, Chicago.....	21.25	19.50	19.50	14.00
Carwheels, Philadelphia.....	20.00	18.50	18.50	14.75
No. 1 cast, Pittsburgh.....	19.75	19.25	17.75	15.25
No. 1 cast, Philadelphia.....	22.25	19.75	19.25	14.25
No. 1 cast, Ch'go (net ton).....	17.00	17.00	17.00	13.00
No. 1 RR. wrot., Phila.....	20.00	18.75	18.75	13.25
No. 1 RR. wrot., Ch'go (net).....	19.00	18.50	18.50	13.25

Coke, Connellsville

Per Net Ton at Oven:	Mar. 23, 1937	Mar. 16, 1937	Feb. 24, 1937	Mar. 24, 1936
Furnace coke, prompt.....	\$4.25	\$4.25	\$4.25	\$3.65
Foundry coke, prompt.....	4.50	4.50	4.50	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.....	16.25	16.25	15.00	9.25
Lake copper, New York.....	16.37 1/2	16.37 1/2	15.12 1/2	9.37 1/2
Tin (Straits), New York.....	64.00	65.25	54.75	47.75
Zinc, East St. Louis.....	7.50	7.50	6.80	4.90
Zinc, New York.....	7.85	7.85	7.15	5.27 1/2
Lead, St. Louis.....	6.80	7.35	6.35	4.45
Lead, New York.....	6.95	7.50	6.50	4.60
Antimony (Asiatic), N. Y....	17.00	17.00	16.00	13.50

The Iron Age Composite Prices

Finished Steel

March 23, 1937
One week ago
One month ago
One year ago

2.605c. a Lb.
2.605c.
2.330c.
2.084c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

	High	Low
1937.....	2.605c., Mar. 9;	2.330c., Mar. 2
1936.....	2.330c., Dec. 28;	2.084c., Mar. 10
1935.....	2.130c., Oct. 1;	2.124c., Jan. 8
1934.....	2.199c., April 24;	2.008c., Jan. 2
1933.....	2.015c., Oct. 3;	1.867c., April 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

Pig Iron

\$23.25 a Gross Ton
23.25
21.25
18.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
\$23.25, Mar. 9;	\$20.25, Feb. 16	
19.73, Nov. 24;	18.73, Aug. 11	
18.84, Nov. 5;	17.83, May 14	
17.90, May 1;	16.90, Jan. 27	
16.90, Dec. 5;	13.56, Jan. 3	
14.81, Jan. 5;	13.56, Dec. 6	
15.90, Jan. 6;	14.79, Dec. 15	
18.21, Jan. 7;	15.90, Dec. 16	
18.71, May 14;	18.21, Dec. 17	
18.59, Nov. 27;	17.04, July 24	
19.71, Jan. 4;	17.54, Nov. 1	

Steel Scrap

\$21.75 a Gross Ton
21.25
19.92
14.75

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
\$21.75, Mar. 23;	\$17.92, Jan. 4	
17.75, Dec. 21;	12.67, June 9	
13.42, Dec. 10;	10.33, April 23	
13.00, Mar. 13;	9.50, Sept. 25	
12.25, Aug. 8;	6.75, Jan. 3	
8.50, Jan. 12;	6.43, July 5	
11.33, Jan. 6;	8.50, Dec. 29	
15.00, Feb. 18;	11.25, Dec. 9	
17.58, Jan. 29;	14.08, Dec. 3	
16.50, Dec. 31;	13.08, July 2	
15.25, Jan. 11;	13.08, Nov. 22	

only mean that other customers will get their material more nearly in conformance with their requests. Bookings from fabricating shops are in good volume and orders from railroad car shops and car builders have picked up. Miscellaneous demand continues unabated.

Bars

Backlogs are easily six to eight weeks, with constant pressure being exerted for delivery. Finishing mill schedules have been stepped up practically to capacity in order to clear plants of all low priced tonnages on the books. Orders at the new prices are not up to the incoming rate of a month ago but are nevertheless in better volume than was anticipated. A heavy movement of material is going forward to automobile manufacturers and farm and implement makers. Specifications from the latter indicate one of the best production records in several years. Resistance to the new prices was short-lived, and practically all customers are interested only in the delivery situation.

Cold-Finished Bars

With backlogs growing, hot bar stock hard to get, and production difficulties increasing, producers are doing little worrying about fresh business, although it is being booked substantially in excess of expectations. Finishing schedules have been stepped up to capacity in an attempt to clear the plants of low priced tonnage, since cost figures are being closely watched in view of recent labor advances. Suspensions from automotive plants have enabled other customers to get deliveries more in line with their requirements. Tractor and farm implement makers are specifying freely while jobbers' business is in good volume. Shipments to machinery manufacturers are heavy, and no letdown in pressure for delivery is noticeable.

Steel Sheet Piling

Awards during the past week were for the most part confined to jobs requiring less than 100 tons. Several large projects will be announced within the near future and will require a substantial tonnage of steel sheet piling. Meanwhile, a fair amount of business at the new prices involving small projects has been placed within the past two weeks.

Reinforcing Bars

Some producers are cancelling unshipped balances of first quarter contracts where complete rolling cannot be scheduled by the end of the quarter. Attempts to load up the books at lower prices are not meeting with success and there is

every indication that carryovers will be less than at any time since code days. An indication of the strengthened position of this market is the elimination of protection on concrete bars consigned to jobbers' stock for identified projects. Bids are in on the Ford Motor River Rouge tire plant, requiring 800 tons. Bids will be in soon on 850 tons for an Omaha, Neb., water supply system.

Plates and Shapes

Publicly financed projects comprise the majority of inquiries in the past week, although a fair amount of the total is for factory, office or plant additions. Awards this week include a substantial tonnage for plant extensions. American Bridge Co. will fabricate 1000 tons of plates and shapes for H. J. Heinz buildings at Fremont, Ohio. Ingalls Iron Works has been awarded a contract for 1100 tons of fabricated material for a store building addition at Dayton, Ohio. Opinion in some quarters has suggested the drying up of new projects as a result of higher prices initiated a few weeks ago but to date there has been no indication that this has been the case. Meanwhile, backlogs of plates and shapes at the mills continue to increase. U. S. Engineers office at St. Louis will take bids on March 30 for five to eight oil barges requiring approximately 1200 tons of plates. Plate deliveries range from eight to 10 weeks.

Railroad Buying

Car inquiries have come to life over the past week with Southern Railway asking for bids on 3000 40-ton boxes and 2600 50-ton hopper cars and gondolas. Lehigh and New England are inquiring for 100 gondolas. Grand Trunk Western has awarded 200 box and 100 refrigerator cars to Pullman Standard Car Mfg. Co. Rail buying has been light, but quite a few orders were offered at first quarter prices, which were turned down by mills.

Sheets

With sheet deliveries becoming more extended each week, demand continues unabated and practically all fresh orders are being placed at prices in effect at time of shipment. Some customers who previously lost their preferred delivery position by not anticipating their needs are in the market to avoid a recurrence of this situation. Consistent pressure for deliveries is being exerted by railroad car builders and farm implement makers. There have been isolated cases of curtailment of production at customers' plants owing to inability to obtain steel.

There are no abnormal stocks at customers' plants and any large anticipatory orders that might exist are on the order books with material being urgently needed by the time shipment is made.

Strip

Specifications for both hot and cold rolled strip at new prices have materialized to a greater extent than was anticipated. Backlogs are still eight to 10 weeks with considerable pressure for delivery. While there was some resistance to the higher prices shortly after announcement, it has disappeared as consumers center their attention on obtaining deliveries which will not embarrass them in their own production schedules. Foreign inquiry has been good with some sales being made at \$5 above published prices.

Tin Plate

Backlogs are substantial with no apparent fall off in specifications. Producers see no change in the present 100 per cent operating rate for some time. Any falling off in domestic demand would immediately see an increase in export orders as producers have not been able to satisfy all foreign inquiry. The acute shortage of steel in Europe indicates a cumulative increase in unfilled tin plate orders, as most steel is being diverted to armaments and other products.

Tubular Products

Production is increasing as mills attempt to get out a substantial amount of forward buying placed previous to the price advance. Oil-country goods specifications continue in good volume, and there is every indication that this type of business will show no drop off in the near future. As soon as the weather opens up it is expected that substantial line pipe orders will be placed. Laying of pipe lines is being held up in some sections of the country owing to the prevalence of deep mud following heavy snow and rain. Jobbers' stocks of standard pipe are dwindling rapidly, owing to heavy demand from home and factory builders.

Wire Products

Active foreign inquiries still disclose offers of \$5 above the domestic market on nails, and in some cases \$10 above quoted prices on wire rods. Seasonal demand for merchant wire items is on the increase, and inquiries for manufacturers' wire at the new prices are strong. Some producers are restricting orders even at the high prices, since there is no disposition to load up the books in view of the inability to judge future steel making costs.



**... Awards of 2120 tons
—5365 tons in new
projects.**

AWARDS

Syracuse, N. Y., 270 tons, regional market, to Joseph T. Ryerson & Son, Inc.

Cincinnati, 1100 tons, new store building for John Shillito Co. to Pollak Steel Co.

Watertown, Wis., 125 tons, Cady Street bridge, to Concrete Engineering Co.

West Bend, Wis., 150 tons, warehouse for West Bend Aluminum Co., to Bethlehem Steel Co.

Hawaii, T. H., 477 tons, fleet moorings, to United States Steel Products Co.

NEW REINFORCING BAR PROJECTS

New York, 345 tons, Sixth Avenue subway; bids March 26.

New York, 195 tons, hospital, Welfare Island; bids soon.

West Point, N. Y., 250 tons, West Point Military Academy barracks.

Pittsburgh, 200 tons, Post-Gazette press and office building.

Erie, Pa., 250 tons, water reservoir, bids soon.

Chillicothe, Ohio, 156 tons, new Veteran's hospital, Roach, Connell & Lamb, Cincinnati, low bidders on general contract.

River Rouge, Mich., 859 tons, Ford tire plant; bids in.

Ann Arbor, Mich., 250 tons, water purification plant; bids in.

Minneapolis, 650 tons, filtration plant; bids soon.

Omaha, Neb., 850 tons, water supply system; bids in.

Holy Cross, Cal., 148 tons, mausoleum; bids opened.

San Francisco, 300 tons, trusses for superstructure on San Francisco-Oakland Bay bridge; bids March 31.

San Francisco, 223 tons, additional for Lyon Street approach to Golden Gate bridge; bids opened.

Los Angeles, 138 tons, girder crossing; bids April 8.

Potholes, Cal., 178 tons, Gila reclamation project; bids opened.

Knob, Cal., 177 tons All-American Canal project; bids opened.

Hatch N. M., 192 tons, Caballo dam reclamation project; bids opened.

Navy Awards Steel To Several Bidders

WASHINGTON, March 23.—The Navy Department yesterday announced awards of contracts for 3500 tons of steel, to cost \$292,270.96, to be used in the construction of six destroyers and three submarines, whose total steel requirements are 9843 tons. Pending also are 2514 tons for stock, on which bids also have been opened.

These tonnages represent steel requirements which were the subject of controversy with the Department of Labor over the terms of the Walsh-Healey Government Contracts Act. Not until the steel industry shifted to the 40-hr. week did makers submit unconditioned bids.

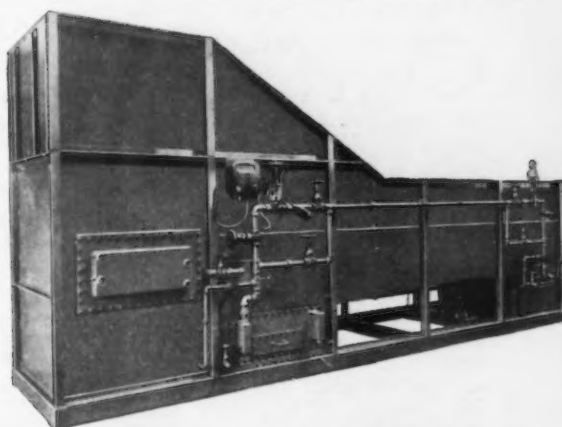
The awards were made at current steel prices, which also have been submitted with regard to the remaining 9039 tons for the destroyers, submarines and stock.

The awards were made as follows: Carnegie-Illinois Steel Corp.,

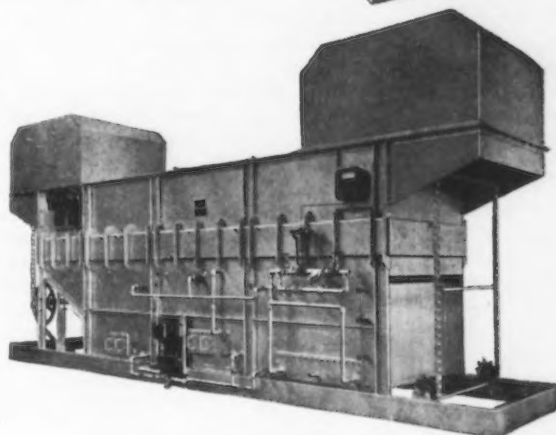
900 tons of angles, shapes, plates, sheets and strips for submarines, \$85,614.50; Joseph P. Cattie & Bros., Inc., Philadelphia, 236 tons of galvanized angles, shapes and special I-beams for submarines and destroyers, \$27,484.56; Jones & Laughlin Steel Corp., 1192 tons of plates, sheets, strips and special I-beams for submarines and destroyers, \$87,460.70; Lukens Steel Co., Coatesville, Pa., 1082 tons of plates for submarines, \$76,650; Enterprise Galvanizing Co., Philadelphia, 90 tons of galvanized special I-beams, \$15,500.

PRODUCTION CLEANING

with
**Scientifically
Designed
Automatic
Detrex
Degreasers**



The completely automatic Detrex Degreaser shown above is used for the production cleaning of metal parts.



High-speed cleaning of large stampings is done automatically in the mammoth, 3-dip conveyorized machine shown at the left.

Detrex Degreasers are designed for high speed, efficient cleaning at low unit cost.

A complete line of standard and special machines — conveyorized and hand-operated — assures you of a properly designed unit to fit the require-

ments of your work. Models are available in any combination of vapor, liquid immersion, and hot solvent spray.

Consult our engineers on your cleaning problems. They are authorities on industrial cleaning operations.

Write for literature or a free demonstration

DETROIT REX PRODUCTS CO.

Metal Cleaning Specialists

13015 Hillview Ave.

New York Office: 130 W. 42nd St.

Detroit, Mich.

Chicago Office: 201 N. Wells St.



CHICAGO

... March bookings, shipments and output breaking all post-depression records.

... Railroad equipment inquiry again appears in substantial volume.

CHICAGO, March 23.—All post-depression records are being broken in all lines of the iron and steel market. Ingot production has pushed upward $1\frac{1}{2}$ points to 83½ per cent of capacity, and new specifications point to a higher rate in the very near future. Releases are the third highest for any week in the year and March shipments mark a new peak since 1929. Forward contracting is climbing to a record and already exceeds the December movement by a wide margin. The result of all this activity is a sellers' market where picking and choosing orders is the general practice.

The carryover into the new quarter is quite imposing, and it is disturbing to producers, who are now trying to avoid repetition at the end of the second quarter. They are harassed by rising costs of labor and materials and they want to take quicker advantage of any future price changes. They evidently see neither a buyers' strike nor a recession in prices because they are pointing all of their attention in the opposite direction.

Some books, such as in sheets, and especially in the coated products, are already practically filled for the coming quarter, and other products, such as bars, are popular to the point where tonnages are being carefully picked so that the most favorable distribution can be made effective in the months to come.

New railroad equipment inquiries are making their appearance, and it is not at all unlikely that new rail buying will soon develop.

Foreign demand for farm implements is climbing and machine tool manufacturers find the European market active.

Pig Iron

New sales at current quotations mark March as the best contract-

ing period since 1929. This is strictly a sellers' market, and tonnages taken in the closing days of the month are being carefully picked. The melt is high in all sectors with the exception of foundries contributing castings to Chrysler and Hudson. Sales of charcoal iron are heavy, and production for the next three months is practically sold out at this time.

Wire Products

March is living up to all expectations in the matter of new business, and books are now loaded to the point where producers are apportioning tonnages in order to assure the best possible service to regular customers. There is also a desire on the part of sellers to check insofar as possible, a strong tendency among consumers to speculate. It now appears that deliveries against first quarter contracts will be made after the end of April. Specifications for all manufacturing lines are excellent, and business being transacted with customers in farm areas is at a new high point for the post-depression period.

Cold-Rolled Strip

Books remain heavy, and second quarter contracts are in such volume that there remains little space for new business that can be shipped during the next three months. Deliveries range from four to six weeks.

Rails

A few indications are at hand that some of the railroads will need additional rail tonnages before they complete their current track programs. In the meantime, local mills are doing all possible to meet shipping requirements, which are limited not by rail rolling capacity but by the time element and the

equipment at hand for the special treatment of a large part of the rails now being specified by the railroads. The light rail market is dull from the viewpoint of domestic needs, but attractive tonnages for export are on order. Accessory departments are well engaged and have substantial orders ahead.

Plates

The railroad equipment market is again on its way to an active period. Price protection is being asked on about 8500 cars which may be purchased by the Pennsylvania, Erie, Chesapeake & Ohio, Pacific Fruit Express, Seaboard Air Line, Central of Georgia and the Soo Line. Specifications are liberal from railroad shops and car builders are still pressing for materials for cars on order. Miscellaneous tank business is good and structural shops are drawing heavily against plate mills. There is prospect of a duplicate gas line from Texas to Chicago. The original line took over 120,000 tons of steel.

Structural Material

For the second week fresh inquiries have been in good volume, but awards are scarce except in the classification exemplified by railroad bridge repair work, which is coming in freely in lots ranging from a few tons to 50 tons. Shops are well engaged, but backlogs are dropping.

Bars

Deliveries on most bar mill products now average close to eight weeks, and this condition reflects the state of second quarter mill books which are now in the state where producers closely scan new business in order that regular customers be given preference. Farm implement manufacturers are at capacity with a rapidly growing demand from foreign users. Tractor plants are fully engaged, and road machinery and machine tool manufacturers are not exceptions to the rule. The carryover from first quarter will extend at least four weeks, a condition which mills are trying to avoid at the end of the second quarter when they hope to take more prompt and fuller advantage of price advances, should they come. This whole problem centers around the uncertainty of costs of both labor and raw materials.

Sheets

New second quarter buying, plus old orders taken for delivery after April 1 and price tagged as of after that date, have practically filled mill books for the next three months. This is especially true of coated sheets.



...BOSTON...

... *Pig iron being sold reluctantly.*

o o o

... *Structural steel fabricators busy.*

BOSTON, March 23.—About 1200 tons of pig iron was sold the past week. None of it was solicited by furnaces, which are reluctant to part with iron. Sales were made only to long-standing customers who are in dire need of supplies. Foundries in general are as active as their supply of molders permits. Were it not for the uncertainty of labor's stand, the New England industrial situation could be termed the best in many years.

Owing largely to construction of State bridges in Massachusetts, steel fabricators are busier than in some weeks. Most cities and towns that had cast iron pipe purchases under consideration have covered requirements.



...CINCINNATI...

... *Flood-damaged mills again in operation.*

o o o

... *Ohio River district output averages 77 per cent.*

CINCINNATI, March 23.—With all district sheet steel manufacturers again in full operation, the last vestiges of the recent flood have about disappeared. Demand is in excess of mill capacity, and the leading district interest reports rolling schedules are nearly filled for second quarter. Galvanized and hot rolled annealed sheets are booked almost solid, while open space on other schedules is not large. It is expected that second quarter books may be filled before April 1.

Steel production advanced a few points the past week to about 77 per cent. The northern Kentucky producer started another furnace,

while an additional unit will be in operation the end of this week. Twenty-six out of 34 open hearths in the Ohio River district are now in operation.

Pig iron buying is not broad, since melters are specifying heavily against contracts to complete commitments by April 1. Movement of iron is heavy.



...PIPE LINES...

Lion Oil Refining Co., Eldorado, Ark., has authorized new 4-in. welded steel pipe line from oil refinery to point on Ouachita River, about 12 miles, for oil transmission to new terminal plant to be built at latter place. Pumping stations will be installed for booster service along route; steel tanks and other facilities will be installed for bulk terminal noted.

Hancock Oil Co. of California, Inc., 2828 Junipero Street, Long Beach, Cal., plans two submarine welded steel pipe lines, 4-in. and 8-in., under entrance channel to Long Beach Harbor, near former bridge of Los Angeles & Salt Lake Railway, for gasoline and fuel oil transmission, respectively.

City Council, Spokane, Wash., closes bids April 1 for 30-in. electric-welded steel pipe line in Mayfair Street for main water line to new pumping station on Hoffman Avenue, about two miles. Bids will be received at same time for pumping plant, including two motor-driven pumping units and auxiliary equipment, with capacity of 15,000,000 gal. in 24 hr. Entire project will cost close to \$100,000. F. G. Sutherlin is commissioner of public utilities; A. W. Lindsay is city engineer.

William O. Edmonson, city manager, Pontiac, Mich., and city officials at Royal Oak and Ferndale, neighboring communities, are completing plans for joint construction of welded steel pipe lines for natural gas supply for industrial service in respective municipalities. It is proposed to make connection with present pipe lines furnishing such service to Detroit, and City Council of last noted city is interested in project.

Cortex Petroleum Corp., Palestine, Tex., plans welded steel pipe line from gas field area to new local natural gasoline plant in Cayuga oil field district, for natural gas transmission. Work on gasoline plant is scheduled to begin at once. Entire project will cost over \$150,000. C. A. and Elliott Middleton are heads.

Gas Service Corp., Colcord Building, Oklahoma City, plans steel pipe line system for natural gas distribution at Tahmina, Okla., where franchise is being secured, totaling about 27,000 ft. of 6-in. for main lines, including welded steel line to Red Oak, Okla., where connection will be made for bulk gas transmission to municipality.

W.A.K. Co., Union Building, Charleston, W. Va., a subsidiary of Godfrey L. Cabot Corp., same address, plans welded steel pipe lines for natural gas distribution at Hinton, W. Va., where franchise has been secured.

Williams Brothers Corp., Tulsa, Okla., has been awarded contract by Oklahoma Pipe Line Co. for 11 miles of 6-in. oil pipe line and for taking up 15 miles of 6-in. line. Pipe to be taken up is near Kinta, Okla., and will be double lengthened for 11-mile line for company's Oklahoma City pump station to vicinity of Moor, Okla. All pipe joints will be Lindewelded.

Pure Oil Co. has let contract for 12-mile, 6-in. oil line to B & M Construction Corp., line to be Lindewelded using stove pipe method of construction.



...GERMANY...

... *No peace-time parallel for boom in steel.*

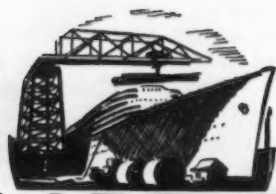
o o o

... *Domestic prices lower than those for export.*

HAMBURG (Special Correspondence)—There is no peace time parallel for the present boom. Fancy prices are offered for steel, and only those markets which had entered into agreements with the European cartel already before the boom started in the summer of 1936 can hope to get steel at official prices. All others pay premiums, which climb up from week to week. The official bar price is £4 7s 6d to £4 15s (gold), but Argentina freely paid £5 17s 6d (gold) and other markets £6 to £6 5s (gold). These are the highest prices since the Ruhr occupation in 1923. Sheet prices were raised by another £1 (gold). There is no outlook for any change, because production cannot be substantially increased in Europe owing to the 40 hr. week in Belgium-France, the lack of coke and scrap and skilled men.

The International Wire Export Co. has stopped sales. The whole European wire production has been sold out for five months and wire netting production for seven months. The makers of wire machinery report 50 per cent increase in orders and are operating at full capacity, with unfilled orders up to one year now on hand. Machinery export prices are also up again.

The shipyards are literally bursting with orders. Turkey, for example, has ordered 14 vessels in Germany of 2200 to 5000 tons, the largest order Turkey has ever placed. Delivery is to take place in the second half of 1939 and the owners will not be able to use the ships regularly before the beginning of 1940. No order can be accepted for an earlier shipment time. The German industry has also booked very large orders from Ethiopia. For example, 656 Diesel engine trucks of five tons (Büssing-NAG). The motor car industry which has quintupled production since 1932 expected to raise the output again by 20 to 25 per cent this year. Automobile prices are further receding.



... PHILADELPHIA ...

... March bookings running ahead of those of February.

o o o

... Production continues at 60 per cent of capacity.

o o o

... Mills are becoming selective in their choice of customers.

PHILADELPHIA, March 23.—Demand for steel has not lessened, and sellers report more orders booked so far this month than in the same period of February. Some, whose bookings have been augmented greatly by specifications on identified projects, say that their March business is running considerably ahead of that in February. A tendency has been noticed on the part of several mills to shy away from protective jobs. Most of the business of this type taken by offices here in December and January will be cleared from the records by March 31, but there is still some tonnage that will be carried until the end of April.

Buyers are placing orders at current prices for all kinds of steel, and the extent to which mills are sold up becomes more and more apparent. This situation is particularly noticeable in sheets and plates, all large producers being entirely out of the market for second quarter in sheets and virtually so in plates. This is also true in some offices where wire and wire products, including nails, are sold. Each week sellers have been forced to lengthen promises of delivery from one to weeks on nearly all types of steel. Buyers are still unconcerned about price, and the chief worry of salesmen is how to turn down orders tactfully. Whenever possible steel is being exported because of the high prices foreign users are willing to pay. One example is the recent sale of wire rods to Turkey at \$55 a ton, \$8 a ton higher than the domestic price. When freight charges, handling charges, extras, etc., were figured in, the price to the consumer was around \$70 a ton.

Bethlehem's bolt and nut plant at Lebanon, Pa., is still shut down, and, although it appears that the majority of the nearly 3000 work-

ers idle there wish to return to work on the basis of the shorter hours and higher wages which were granted two weeks ago, the CIO still is insisting that it be recognized as the bargaining agency. Last week, at an election sponsored by the National Labor Relations Board, employees of the Sun-Shipbuilding and Dry Dock Co., Chester, Pa., voted by 2398 to 1412 to allow the majority of the workers to be represented by the Sun Ship Employees Association, Inc. Union organizers are active at other plants in this district, but no disturbances have been reported.

Not wishing to work overtime and apparently not yet ready to put on additional men, one local mill has cut production 16 2/3 per cent and has taken off one open-hearth furnace in order to operate on a 40-hr. week. This reduction has been compensated for, however, by the addition of a furnace at Pencoyd, the district operating rate remaining at 60 per cent of capacity.

The Navy Department awarded contracts Monday for more than 7,000,000 lb. of steel for use in construction of destroyers and submarines. The Lukens Steel Co. was awarded 2,165,000 lb.; Joseph P. Cattie & Bros., Philadelphia, 472,000 lb.; and Enterprise Galvanizing Co., Philadelphia, 180,000 lb.

Pig Iron

Little activity has been reported this week, most sellers having no iron to sell. The scarcity of ore and the price increase of 45c. a ton, together with the shortage of furnace coke, has not made the lot of the independent producer a happier one in spite of the higher iron prices. Negotiations are still underway whereby at least two merchant furnaces in the district may go into blast. Another price increase the first of the quarter is

being talked of, but most sellers believe and hope that such will not be the case, as the rapidity of the recent price advances may bring a spirit of caution. Shipments are heavy and will continue so to the end of the month. Buyers are so well covered throughout next quarter that it appears now that the iron shortage will carry over for the next three months at least, as there will be little remaining for spot business. In the light of the tremendous foreign demand, it is surprising to notice tonnages from British India and the Netherlands being received at Philadelphia.

Plates and Sheets

With deliveries of plates ranging from 6 to 12 weeks and sheets from 8 to 23 weeks, it is not strange that sales offices have become selective in their choice of those to whom tonnage is sold. All mills are striving to accommodate their regular customers in every way, and, when this is done, many find themselves unable to do much for anyone else, so great is the demand from their steady buyers. Consumers who are shopping for delivery and are prepared to pay premiums for speedy shipment are finding even this bit of subtle persuasion unavailing at the mills. Bids on two new battleships will be received in Washington, June 2. Few mills are able to ship tonnage abroad, although demand has in no way eased.

Structural Shapes

Award of only a few hundred tons of shapes has been reported this week, and no pending projects of any size have been announced. On the list are small construction projects for the Atlantic Refining Co., du Pont Co., and Owens-Illinois Glass Co. The fabricators that figure in the awards are Belmont Iron Works, Reiter Engineering Co., and Lehigh Structural Steel Co.

Imports

The following iron and steel imports were received here during the past week: 5065 tons of chrome ore from South Africa; 645 tons of pig iron from the Netherlands; 1000 tons of pig iron from British India; 9 tons of steel billets; 2 tons of steel tubes and 14 tons of steel bars from Sweden; 39 tons of steel bars, 5 tons of steel floor plates, and 99 tons of structural shapes from Belgium.

Roller-Smith Co., New York, has appointed Paul Berry, 2528 N. W. 21st Street, Oklahoma City, Okla., at its agent in that State, the Panhandle of Texas and the northern part of Arkansas.



..SAN FRANCISCO..

... Reinforcing bar awards the principal activity.

SAN FRANCISCO, March 22.—Pacific Coast mills are running at capacity to complete before April 1 all orders for reinforcing bars made under old prices. Activity is greater in the bar market than at any time during the past six months. New reinforcing projects, nearly all of them under 300 tons, aggregate approximately 3000 tons. Jobs under 100 tons make up about a third of this total.

The structural market shows very little activity.



..GREAT BRITAIN..

... Federation arranges to buy 400,000 tons of Indian pig iron.

o o o

... Also negotiating with Russia for pig iron and scrap.

LONDON, March 23 (By Cable). —The first half year's pig iron output is fully sold and makers are reluctant to book farther ahead, but several additional furnaces are being relit. The British Federation has arranged for 400,000 tons of Indian pig iron and is negotiating with Russia for supplies of pig iron and scrap.

So far, the reduction in British import duty has not resulted in increased imports from the Continent as the cartel countries need material themselves and are not attracted by the prices obtainable in Great Britain. Consequently, re-rollers are unable to keep their plants fully occupied. British output capacity is increasing slowly.

Finished steel makers can accept orders only for far forward delivery and subject to the new price becoming effective in June. It is suggested that the steel shortage is less pronounced than is apparent as consumers are ordering more than their requirements in the hope

of getting something like the amount really needed. Large Admiralty orders have been placed.

South Wales tin plate output quota has been raised five points to 75 per cent, but appreciable production increase is doubtful owing to the steel shortage. The demand is active and sellers are now asking about 24s., f.o.t., export and 23s. 6d., f.o.t., home.

Releases of Continental export steel are slightly larger but still inadequate. British and Continental export prices on galvanized sheets have been raised 20s. Continental gold prices on plates and thick sheets have been advanced 15s.



RAILROAD BUYING

Atlantic Coast Line is considering the purchase of several locomotives. This road is inquiring for 100 to 400 50-ton box cars, 200 50-ton automobile cars, 100 70-ton phosphate cars, 15 all-steel coaches and 15 express cars.

Lehigh Valley has ordered 10 locomotive tenders from American Locomotive Co.

Central of Georgia is inquiring for 500 50-ton box cars and 100 40-ton box cars.

Grand Trunk Western has ordered 100 refrigerator cars and 200 automobile cars from Pullman-Standard Car Mfg. Co.

Minneapolis, St. Paul & Sault Ste. Marie is inquiring for 250 to 350 box cars 50-ft. long, 100 box cars 40-ft. long, 100 hopper cars, 100 general service cars and 100 ballast cars.

The Erie will buy 1000 box cars.

Chesapeake & Ohio will enter the market for 1000 box cars.

Pacific Fruit Express will purchase 500 refrigerator cars.

Seaboard Air Line is expected to buy from 500 to 1000 cars.

Southern Railway is inquiring for 3000 40-ton box and 2600 50-ton hopper and gondola cars.

Lehigh & New England is inquiring for 100 gondola cars.

American Car & Foundry Motors Co. has received the following orders for motor coaches: One from Hart Bus Lines, Inc., Saugus, Mass.; six from Santa Fe Trails of Illinois, Chicago, and 18 from Connecticut Co., New Haven, Conn.

J. G. Brill Co. has received an order from Mill Power Supply Co., Greenville, S. C., for two 30-passenger Brill trackless trolleys.

RAILS AND TRACK SUPPLIES

Cambria & Indiana has ordered 350 tons of rails for early delivery.

Lonergan Mfg. Co., manufacturer of heating appliances, formerly of Michigan City, Ind., has recently removed its manufacturing plant and general offices to Albion, Mich.



CANADA

... Pig iron prices are advanced \$4 a ton.

o o o

... Production in all lines moves to higher levels.

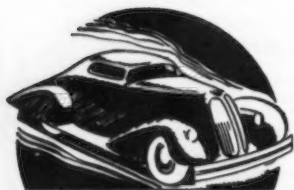
TORONTO, March 23. — Plant operations have been advanced considerably. Foundry operations now range from 65 to 75 per cent, while steel mills mostly are on full time. Backlogs have reached the highest level in years, and new orders both from domestic and foreign sources are appearing in increasing number. Demand for iron and steel is general.

Many companies have been improving plants and replacing obsolete machinery. Mining machinery is at a premium, and orders placed for other lines of machinery have an indefinite delivery date.

Steel mills are accepting only short term contracts. Prices have been moving up and high levels are in prospect for many lines of machinery, tools, iron and steel.

Merchant pig iron prices have been moved up sharply in both the Toronto and Montreal districts, with current quotations \$4 per ton above prices at the beginning of the year. Melters are showing interest in the market and, while some have placed contracts for second quarter, others are inquiring for iron but now have to pay the higher price. Sales are currently running around 2000 tons per week, largely due to the scarcity of scrap. Melters state that they are experiencing difficulty in obtaining scrap for mixing and are forced to use increased tonnages of pig iron. The advance in price, however, has tended to bring some competition into the market from the United States, and it is stated that United States producers now are offering iron in the Canadian markets. Production also is increasing and it is understood that additional blast furnaces soon will blow in.

General scarcity of iron and steel scrap is responsible for sharp increase in prices of old materials, and consumers are experiencing difficulty in obtaining scrap. Iron grades are at a premium now, despite the higher prices now offered by dealers, there is little material being thrown on the market.



... CLEVELAND ...

... Operations rise as mills strain to clear low priced business from books.

... ..

... Mills well filled up on sheets for second quarter; bar bookings heavy.

... ..

... 60,000,000-ton ore movement expected; steel scrap advances \$1 a ton.

CLEVELAND, March 23.—In their efforts to clean up first quarter orders for finished steel as far as possible by April 1, mills have further increased ingot output one point in both the Cleveland-Lorain and Youngstown districts, operations now being at 82 per cent in the former and 88 per cent of capacity in the latter. One Youngstown plant is operating at over 93 per cent of capacity. Finishing mills are being operated at a maximum rate.

Not a great deal of low priced first quarter tonnage will be carried over until April, and it is expected that practically all of this will be shipped by April 15. Mills have orders for about all the sheet tonnage they can produce in the second quarter and are filled up nearly as long with strip. One producer has a five months' backlog in some grades of sheets. When mills became well filled for the first quarter with sheets and strip, they started to take business subject to prices prevailing at the time of shipment and this will carry the higher prices after April 1.

Steel held up by the General Motors strike has all been released and much of it shipped. Shipments suspended by the Chrysler and Hudson companies will be carried over until the next quarter. These suspensions have not interfered with mill operations, as other tonnage has filled the rolling schedules.

The volume of new business in finished steel in March was about on a par with that in December and January and exceeded that in February. Bar sales during March are said to have broken all records, and some of the producers with large bar capacity have for the

first time since the revival of the steel industry accumulated good backlogs.

While new business in the heavier hot rolled products has subsided since the advance in prices became effective, the demand for sheets and strip continues very active, consumers being anxious to get their orders on the mill books so that they will have the steel when needed. Large purchases of sheets and strip steel for April and May delivery were made by General Motors and other automobile companies during the week, space for this expected business having been reserved on mill schedules by regular suppliers. Forward buying of sheets and strip and wire products is being restricted to some extent by the policy of several mills to take no orders that they cannot fill during the second quarter. Others are entering business regardless of the size of their order books, booking this at the prices prevailing at time of shipment.

The Ford Motor Co. has covered for its iron ore requirements for the year by the purchase of 315,000 tons. Leading ore shippers have made commitments for virtually all the ore they can mine and ship during the season.

Steel-making scrap has again advanced \$1 a ton on local consumer sales.

Pig Iron

Foundries are specifying heavily against first quarter contracts placed in December at \$3.50 a ton below the present market prices, and few will allow their contracts to lapse. Furnaces are rushing shipments in order to get nearly all of the iron out by April 1 and some are crowding their furnaces to in-

crease their output. Shipments by some of the merchant furnaces are in excess of production. About the only foundries not taking out their iron are those making Chrysler and Hudson castings, considerable iron having been held up by these foundries. Buying continues in good volume, most producers covering for all the iron they will need for the coming quarter.

Iron Ore

Ford Motor Co. has placed orders for its 1937 ore requirements, which were covered by its recent inquiry for 315,000 tons. The business was divided among four or five ore firms. Consumers have placed orders with ore firms with which they have long term contracts for their ore requirements for the season and it is stated that there is little ore left on the market for sale for this season's delivery. Some producers have sold all the ore they will be able to get out and have entirely withdrawn from the market. Some of the shippers are planning to start their boats April 1, provided ice conditions permit. Predictions are that the season's movement will exceed 60,000,000 tons.

Consumption of Lake Superior ore in January was 4,443,306 tons. This was a decrease of 251,006 tons as compared with January, although the daily melt increased. In February, last year, 2,632,306 tons of ore was melted. Shipments of ore from Lake Erie ports continued at a heavy rate during the month, amounting to 415,929 tons as compared with 67,912 tons during the same month a year ago. Dock stocks have been reduced very rapidly, having been 3,337,168 tons on March 1 or 1,567,000 tons less than on the same date a year ago. Furnace stocks are also being reduced rapidly. Stocks at furnaces and docks March 1 were 22,417,692 tons, or 3,380,835 tons less than on the same date a year ago. At the present rate of consumption these stocks will be less than 18,000,000 tons April 1 and perhaps below 14,000,000 tons on May 1, although the amount on that date will depend on the quantity of ore that shippers are able to move down the Lakes by water during April. There were 146 furnaces in blast using Lake ore Feb. 28, an increase of five for the month.

Sheets

The automobile industry came into the market again during the week with orders that aggregated a large tonnage for April and early May delivery. This business came from various General Motors and other automobile plants with the exception of Chrysler and Hudson. All shipments to the Chrysler

plants are still being held up because of the strike. Substantial purchases were made for the Fisher Body plant in Cleveland. While many mills report that they are filled up for the second quarter and deliveries on some products have been further extended, mills that supply large quantities to the motor car industry have reserved space on their rolling schedules for orders from that industry. Demand is heavy from makers of refrigerators, stoves and other household equipment, from jobbers, culvert and grave vault manufacturers and other miscellaneous consumers. The heaviest demand at present for sheets for early delivery appears to be for galvanized and light gage hot rolled.

Bars, Plates and Shapes

While bar sales have been very heavy this month and many consumers covered for rather extended requirements before the price advance, some business is being placed at the second quarter prices by consumers who want to get their orders on the mill schedules. Delivery promises now range from four to eight weeks. Alloy bars are moving well. There is somewhat more activity in the structural field than recently. A hockey rink in Cleveland requiring 1200 tons has been placed. The Ohio Highway Department will take bids next week for grade crossing work in Toledo requiring 650 tons. Mills have entered a heavy volume of miscellaneous plate business.

Strip Steel

Considerable new business was placed during the week by motor car manufacturers, making deliveries more extended. Some mills are filled up for eight or 10 weeks on hot strip and eight weeks on cold rolled material. With order books well filled, some producers are not taking any additional second quarter tonnage.

Wire Products

New business at the advanced prices has so far been light. However, mills have backlogs that will keep them well filled until May 1 or longer. Demand for manufacturers' wire is heavy, and some producers have so much tonnage on their books that they are declining any more business for the second quarter.

Bolts and Nuts

Heavy specifications against first quarter contracts have been driven out by the price advance. While these orders are being entered for immediate shipment, makers will be unable to complete deliveries until well along in April.



... Steel production holds steady.

BUFFALO, March 23.—Pig iron prices are firm and demand is good for second quarter delivery. Furnace operations are the same.

Open-hearth operation shows Bethlehem's Lackawanna plant with 28 out of 30 units active; Republic with eight out of nine and Wickwire Spencer Steel Co. with two out of four.

A Buffalo concern has the contract for 270 tons for a regional market building in Syracuse. The Pennsylvania Railroad crossing elimination in Silver Creek will require 115 tons of reinforcing bars.



... Buying of steel holds at a good rate.

... Pig iron users laying in protective stocks.

ST. LOUIS, March 23.—Buying of steel continues at a lively rate, with sheets and plates leading in demand, as they have been doing for some time. Consumers are still more concerned with deliveries than price.

Structural fabricators are said to be operating at between 50 and 60 per cent of capacity, and have enough business booked to continue at that rate for between six and eight weeks time. New structural projects have been few in number during recent months.

Warehouse prices have been advanced in line with recent mill increases.

Buying of pig iron by melters in the St. Louis area continues on a fairly large scale. While there will be a carry over from the first quarter into second quarter, melters are buying with the idea of laying in stocks against further increases

and the prospect of a shortage in supplies. It is protective rather than speculative buying. The melt continues at the peak rate. Agricultural implement makers are working to full capacity, as are the stove interests.

Ingot operations in the St. Louis area are up to 88 per cent of capacity.



... Mills and furnaces are heavily loaded with orders.

o o o

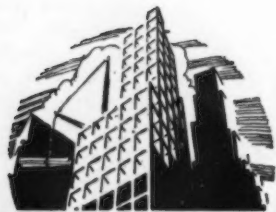
... Production undiminished.

BIRMINGHAM, March 23.—The steel mills and blast furnaces of the district are again heavily loaded with forward tonnage and can gear themselves to a long period of high operations. There is a steady pressure on the mills and furnaces for shipments, and they cannot keep pace with demands. It has been many years since market conditions have matched those of the present. The flood of new business in the last few months has taxed the mills far beyond their capacity to ship promptly.

It will likely be some time before the new prices are fully tested. There is said to be some bookings of products at the prevailing high levels, but the amount is limited, as buyers bought liberally before the advances came. Specifications against contracts are increasing. March shipments will be higher than in either of the two preceding months.

As was to be expected, there is more and more talk of the rapid price advances in the last few months. Whether the markets have gone too far too fast is a question that cannot be ascertained just at present, as the new prices have as yet affected buyers only to a limited extent.

Production of iron and steel is undiminished. Last week 16 blast furnaces operated; also 18 to 19 open hearths. Schedules this week call for the same number of blast furnaces and 18 open hearths.



... NEW YORK ...

... March steel business will break December and January records.

... Sheet mills booked solid for second quarter.

... Present prices below those of 1926 on some products.

NEW YORK, March 23—Notwithstanding apprehensions in Government circles in Washington and among economists that wage rises and price rises are creating a dangerous upward spiral and that continued labor unrest is a further danger signal, steel business goes on at an almost unprecedented pace. March bookings in this district by some of the steel companies will exceed those of either December or January, which were record-breaking months.

Although the sold-up condition of the mills has been the subject of comment for many weeks, it is stated that this condition is getting worse rather than better despite increasing production. Most of the sheet mills are sold out completely for the second quarter. A leading producer is now quoting 23 weeks on some grades of sheets, which is a week longer than the longest delivery quoted a week ago. Such delivery will fall late in the third quarter, and the business is being taken, as were many second quarter orders, on the basis of price at time of shipment. In most other products, except tubular goods, there is very little open space on mill schedules for the second quarter. While there are few, if any, instances of steel shortage resulting in curtailment of consumers' manufacturing operations, there are plenty of evidences of unsatisfied requirements. For example, some of the railroads, which now find it necessary to hasten repairs of bad order equipment, are not able to get all the steel they need as quickly as they would like to have it. Mills are turning down a good deal of business that is offered solely because they do not want to load up their books more heavily until they find out more clearly where they stand with re-

spect to production and deliveries. Not all mills are interested in booking tonnage for third quarter even on a price-at-time-of-shipment basis.

Surprisingly, most of the talk regarding high steel prices comes from those who are not buyers of steel. Buyers are more interested in getting steel than in price. The answer of the steel companies to outside criticism of present quotations is that the present level, which may or may not compensate for wage increases and other rising costs, is not above the 1926 average, which has been the aim of the Federal Administration throughout its entire recovery program. Rails are 50c. a ton less than in 1926, tin plate \$13 a ton less, cold rolled sheets, 20 gage, \$15 a ton less, and some other products are only moderately higher, and in some cases lower, than in 1926. On the face of published quotations, bars are \$9 a ton higher than in 1926, but this does not tell the whole story, as the \$3 a ton deduction for quantities of 150 tons or over was not in effect in 1926. Moreover, it is pointed out that the quality of merchant steel bars today is equal to the forging quality of 11 years ago, for which an extra of 25c. per 100 lb. was charged; so that, taking these facts into consideration, bars cost very little more than in 1926. These comparisons leave out of consideration the fact that labor costs are substantially higher than in 1926, today's basic rate of 62½c. per hr. comparing with 50c. per hr. in 1926 for 8 hr. a day.

Whether the present price level will eventually act as a deterrent upon buying cannot be determined from any present evidence, which points quite clearly to sustained demand and consumption for some months to come. It appears that

second quarter schedules in nearly all products will be fairly well filled up within the next two or three weeks at most, and there will be considerable tonnage on mill books for third quarter production.

Pig Iron

Inability of foreign buyers to obtain the large tonnages asked for from furnaces along the Atlantic seaboard has caused a considerable volume of this inquiry to move west, and last week Japan is reported to have settled for 25,000 tons with the Struthers, Ohio, maker. Merchant stacks in this district are mostly unable to accept much additional business for second quarter shipment, but some are still taking small orders for foreign as well as domestic delivery. The larger domestic users are well covered, and remain inactive, and only those customers who buy for prompt shipment in small lots appear to be anxious to place orders. A single domestic inquiry for 300 tons for shipment spread over the second and third quarter was the largest reported last week. While most furnaces are parceling out tonnages to consumers as needs arise, some are virtually sold out for the quarter and have no prompt iron to offer. In general, more demand from domestic users exists than can be filled, whereas the heavy accumulation of foreign inquiry is without possibility of being satisfied in this area. Producers are inclined to believe that a large proportion of domestic buyers are insufficiently protected, and will subsequently realize a need for additional iron in the face of a further restriction in the supply. On this basis, prices should eventually be forced higher than they now are. The stack at Troy, N. Y., is relining in expectation of going into blast within a few weeks.

Plates and Sheets

Sellers of plates and sheets do not find that incoming business has yet lessened to an appreciable degree, although after March 31, which is the deadline set for the receipt of identified projects, it is believed that a slight reaction may become apparent. Only a few companies are able to accept sheet orders for second quarter rolling, and in practically every instance inquiries must be submitted to mills for approval. A great deal of tonnage is being turned down, as buyers, unable to secure the delivery they desire from their regular sources, shop around and find that most sellers are able to accommodate only their own regular customers. Some very attractive export orders are being taken at prices several dollars a ton above domestic quotations.

Steel Mills Seek Restriction On Heavy Exports of Scrap

A GROUP of Eastern steel companies have initiated a movement to go before Congress for legislation that will provide an adequate curb on the large exports of iron and steel scrap now going out of the country. Although primary action originated with this group, consisting chiefly of mills in eastern Pennsylvania, the moral and active support of other steel companies throughout the United States has been promised.

An effort is being made to sponsor a bill which would provide a licensing system or quota basis similar to that governing the export of tin plate scrap. It is known that there is considerable sentiment in Congress for some sort of legislation that will retain essential supplies of scrap in this country and place a curb on runaway prices.

Just how soon such legislation could be passed and made effective is not yet clear. Hearings would be necessary before the bill goes to the floor of Congress, and it is regarded as certain that scrap dealers who have been extensively engaged in exportation of scrap would appear in opposition to the plan. Scrap dealers have insisted that there is no actual shortage of scrap in the United States, but the mills contend that a shortage will occur if heavy exportations are continued very much longer.

Exports are draining principally the seaboard markets, but an effect upon prices in the Pittsburgh and other central areas is produced through the fact that scrap from New England and some other sections of the East that normally flows to Pittsburgh now mainly goes out of the country. Attention has been called to the current large exports by the fact that railroad embargoes have recently been placed in effect at Port Richmond, Philadelphia, and at Boston because accumulations of loaded cars were piling up more rapidly than ships became available for outbound loading.

One of the outstanding contentions of the steel companies in support of regulation of exports is that virtually all other steel-producing countries in the world have placed restrictions upon scrap, either by preventing hoarding or by prohibiting exports, or by both methods. In Great Britain an agreement was recently arrived at

between the British Federation of Iron and Steel and leading scrap merchants whereby exports were prohibited and prices were stabilized.



Carthage, N. C., plans pipe lines for water system and other waterworks installation. Fund of \$58,000 is being arranged through Federal aid for this and sewage treatment plant.

Eldorado, Kan., closes bids March 30 for various size for water system; also for elevated steel tank and tower. Cost about \$50,000 out of total of \$120,000 arranged for extensions and improvements in waterworks system. Paulette & Wilson, National Reserve Building, Topeka, Kan., are consulting engineers.

De Pere, Wis., closes bids March 30 on 4200 ft. of 6-in.

Braham, Minn., plans about 14,000 ft. of 4, 6 and 8-in. for water system; also 50,000-gal. elevated steel tank on 100-ft. tower. Special election has been called on March 29 to approve bond issue for work.

Kandiyohi, Minn., plans pipe lines for water system and other waterworks installation, including 50,000-gal. elevated steel tank and tower. Ealy G. Briggs, 1957 University Avenue, St. Paul, is consulting engineer.

Beaver Crossing, Neb., plans pipe lines for water system. Fund of \$35,800 is being arranged through Federal grant and loan for this and sewerage system. Scott & Scott, Bankers' Life Building, Lincoln, Neb., are consulting engineers.

St. Marys, Mo., will open bids March 26 on 15,130 ft. of 2, 4, 6 and 8-in. for a waterworks system. A 50,000-gal. steel tank and 75-ft. tower will be installed. Russell & Aton, St. Louis, are engineers.

Corinne, Utah, plans 20,000 ft. of 4-in., 10,000 ft. of 2-in., and 5000 ft. of 1-in. for water system, replacing present wood pipe lines. Robert G. Harding, Utah Savings & Trust Building, Salt Lake City, Utah, is consulting engineer.

Vancouver, Wash., plans new main pipe line for water supply from source at local springs to pumping station. Cost about \$66,500; also other extensions and improvements in distributing lines and waterworks stations. Municipality is arranging for purchase of local properties of People's Water Co., for \$600,000, with additional fund of \$250,000 for expansion and betterments, including work noted, installation of pumping equipment and accessories, and other waterworks equipment. Special election has been called on March 30 to approve bond issue of \$850,000 for entire project. J. W. Cunningham, Spalding Building, Portland, is consulting engineer.

Bellingham, Wash., is considering extension of main pipe line system along Guide Meridian Road to site of new State custodial school at Guide Meridian and Smith Roads, about 4½ miles, for water supply at institution.

Oakland, Cal., will open bids March 31 on 500 tons of 6, 8, and 10-in. pipe for Municipal Utility District.

S. S. Marshall Heads J. and L. Operations

S. S. Marshall, Jr., has been elected vice-president in charge of operations and a director of the Jones & Laughlin Steel Corp. Mr. Marshall, who has been general manager of operations since January of this year, started with Jones



S. S. MARSHALL

& Laughlin in 1903 in the engineering department of Pittsburgh works. In 1914 he became master mechanic and three years later assistant general superintendent of the Eliza works. In 1925 he was made assistant general superintendent and after a few years was made general superintendent of the South Side works. Mr. Marshall became general superintendent of the Pittsburgh works in 1929 and held that position until 1936 when he was made assistant general manager of operations, subsequently being made general manager.

British Iron Works Changes Hands

LONDON (Special Correspondence). The works of the Langloan Iron & Chemical Co. has been purchased by Thos. W. Ward Co. of Sheffield. There are five blast furnaces, having a capacity of 65,000 to 100,000 tons a year, which will be put into a blast again if the necessary ore is available.



FABRICATED STEEL

... Lettings slightly higher at 18,900 tons compared with 17,900 tons last week.

o o o

... New projects advance to 23,870 tons as against 11,415 tons a week ago.

o o o

... Plate awards call for 2670 tons.

NORTH ATLANTIC STATES

Cambridge, Mass., 1000 tons, fertilizer building, to New England Structural Co., Everett, Mass.

Ludlow-Wilbraham, Mass., 200 tons, State bridge, to Bethlehem Steel Co.

Springfield, Mass., 100 tons, store, to Lehigh Structural Steel Co.

West Point, N. Y., 965 tons, armory, to American Bridge Co.

New York, 580 tons, express highway viaduct, West 186th Street to West 191st Street, New York Central Railroad, to American Bridge Co.

New York, 400 tons, apartment building, 108 East 87th Street, to Harris Structural Steel Co.

New York, 420 tons, apartment building, 231 East 76th Street, to Dreier Structural Steel Co.

Collins Landing, N. Y., 3250 tons, Thousand Islands International Bridge, to American Bridge Co.

Somers, N. Y., 150 tons, grade and high school, to Weatherly Steel Co.

Dresden, N. Y., 900 tons, power house, New York State Electric & Gas Corp., to Belmont Iron Works, Philadelphia.

New Market, N. J., 340 tons, Washington Avenue grade crossing, to American Bridge Co.

Carney's Point, N. J., 200 tons, du Pont ethyl-chloride plant, to Belmont Iron Works.

Point Breeze, Pa., 125 tons, tower supports for Atlantic Refining Co., to Lehigh Structural Steel Co., Allentown, Pa.

THE SOUTH

Frankfort, Ky., 1050 tons, Kentucky River bridge, to Bethlehem Steel Co.

Danville, Ky., 155 tons, Goodall factory, to Bedford Foundry & Machine Co., Bedford, Ind.

Virginian Railroad Co., 915 tons, bridges, to Virginia Bridge Co.

Baton Rouge, La., 800 tons, Louisiana State University building, to Bethlehem Steel Co.

DeWitt County, Tex., 250 tons, State bridge, to Illinois Steel Bridge Co.

CENTRAL STATES

Dayton, Ohio, 1100 tons, addition to Rike-Kumler Co. store, to Ingalls Iron Works Co.

Cleveland, 1200 tons, hockey rink, previously reported as 1000 tons, to Fort Pitt Bridge Works Co.

Cleveland, 180 tons, Ohio Bell Telephone exchange, to Fort Pitt Bridge Works Co.

Galion, Ohio, 130 tons, vault for factory building, to Ingalls Iron Works.

Cincinnati, 220 tons, Hilton Davis Chemical Co. building, to Joseph T. Ryerson & Sons Co., Inc.

Dearborn, Mich., 520 tons, Montgomery Ward & Co. building, to Whitehead & Kales.

Detroit, 810 tons, stack house for Great Lakes Steel Corp., to Lackawanna Steel Construction Co.

Gladstone, Mich., 115 tons, Northwest Veneer & Ply Co. plant, to American Bridge Co.

Bloomington, Ind., 120 tons, University of Indiana building, to Central Steel Bridge Co.

Richmond, Ind., 1225 tons, mill building, to International Steel & Iron Co., Evansville, Ind.

South Bend, Ind., 180 tons, Notre Dame dormitory, to Mississippi Valley Structural Steel Co.

Chicago, 360 tons, Benson & Rixon Co. addition, to Carnegie-Illinois Steel Corp.

Chicago, 235 tons, Esquire Theatre, to New City Iron Works.

Chicago, 420 tons, alterations to foundry building, Link Belt Co., to Reuter Bros.

Champaign, Ill., 105 tons, soy bean plant, to Mississippi Valley Structural Steel Co.

Clinton, Iowa, 465 tons, approaches to bridge, to Clinton Bridge Co.

Kimberly, Wis., 115 tons, buildings, to Vulcan Mfg. Co.

Northern Pacific Railroad Co., 255 tons, turntables, to American Bridge Co.

WESTERN STATES

San Andres, Cal., 225 tons, building for Calaveras Cement Co., to Consolidated Steel Co.

Portland, Ore., 100 tons, radio towers for station KGW, to Truscon Steel Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Yarmouth, Me., 120 tons, State bridge.

Royalston, Mass., 100 tons, State bridge.

Lawrence, Mass., 100 tons, purification plant.

New York, 500 tons, repairs to Manhattan Bridge.

New York, 600 tons, building, F. W. Woolworth Co.

New York, 3800 tons, express highway viaduct, 153rd Street to 160th Street, New York Central Railroad.

Brooklyn, 600 tons, addition to public school No. 169.

Minetto, N. Y., 250 tons, building, Columbia Mills, Inc.

Camden, N. J., 300 tons Thomas F. Gibson can cooling building.

Washington, 500 tons, Potomac Decatur telephone exchange building.

THE SOUTH

Memphis, Tenn., 550 tons, tram rail supports.

Kingsport, Tenn., 500 tons, building.

Elm City, N. C., 250 tons, State bridge.

Dallas, Tex., 500 tons, Haskell exchange addition, Southwestern Bell Telephone Co.

CENTRAL STATES

Toledo, Ohio, 650 tons, Broadway grade crossing elimination, bids March 30.

Cleveland, 125 tons, Aquacade building for Cleveland exposition.

Dayton, Ohio, 800 tons, store.

Detroit, 2500 tons, balcony framing, Ford Motor Co., Giffels & Vallet Inc., engineer.

Detroit, 300 tons, manufacturing and office building, La Choy Food Products, Inc., Giffels & Vallet, Inc., engineer.

Lansing Mich., 400 tons, factory building, Olds Motor Works.

Stickney, Ill., 2600 tons, sludge building, sewage plant for Sanitary District of Chicago.

Minneapolis, 250 tons, repairs to Mississippi River bridge, Milwaukee Road.

Wabash Railway, 350 tons, bridges in Missouri and Indiana.

Topeka, Kan., 1900 tons, State bridge over Kansas River.

Cap-au-Gris, Mo., 6000 tons, dam across Mississippi River.

WESTERN STATES

Green River, Wyo., 311 tons, overhead pedestrian crossing; bids March 27.

San Francisco, 116 tons, pipe railing for superstructure on San Francisco-Oakland Bay bridge; bids March 31.

FABRICATED PLATES

AWARDS

Hartford, Conn., 255 tons, foundation cylinders, to Gifford Wood Co.

Norwalk, Conn., 100 tons field tanks for Cities Service Co., to Norwalk Tank Co., South Norwalk, Conn.

Bridgeton, N. J., 180 tons, producer piping, to Reiter Engineering Co.

Cairo, Ill., 310 tons, two derrick barges, to Dubuque Boat & Boiler Co.

Cincinnati, 1500 tons, six deck barges for Barret Lines, Inc., to American Bridge Co.

Vicksburg, Miss., 220 tons, derrick barge and derrick, United States Engineer's Office, to Treadwell Construction Co.

Sarasota, Fla., 102 tons, pressure tanks for Smith & Co., to Norwalk Tank Co., South Norwalk, Conn.

NEW PROJECTS

St. Louis, 1200 tons, eight oil barges, United States Engineers.

Manitowoc, Wis., 400 tons, elevated steel water tank; bids close March 25.



...NON-FERROUS...

... Weakness abroad disturbs some metals here.

o o o

... Lead reduced \$11 a ton; stocks off by 13,000 tons.

o o o

... Tin lower on speculative selling; copper unchanged; zinc active.

NEW YORK, March 23.—Non-ferrous metals weakened noticeably in London during the week, with consequent effects

in some cases upon domestic conditions, but at a late hour today the tone generally grew firmer. Extensive liquidation of copper hold-

ings abroad during the week permitted prices to drop, and in the domestic market demand grew lighter. While the metal for export sold lower on less active trading, producers maintained the domestic quotation at 16¼c., Connecticut Valley. Sales showed no improvement until yesterday when domestic users grew more active, at least temporarily, and purchased 3873 tons, thus raising the month's total sales to 37,125 tons. Sales for exportation have shown no similar improvement, and prices on this business at present range from 16.52c. to 16.57c., c.i.f., Europe, or closer than for a considerable period to parity with the domestic price. Possibility of a downward adjustment in the latter quotation depends on further developments in this direction.

Lead

Domestic prices followed London last week, and the base quotation was lowered \$5 a ton on March 17 and \$5 a ton additional on March 19. Today the American Smelting & Refining Co. reduced the price \$1 further to 6.80c., St. Louis, but the St. Joseph Lead Co. did not follow. Current base quotations are therefore 6.80c. and 6.85c., St. Louis. Demand quieted as the market weakened, but consumers have covered on about 98 per cent of March needs and 80 per cent of April's, thus leaving little further business for attention until May order books are opened. Lead shipments during February exceeded 50,000 tons and stocks declined by some 13,000 tons.

Zinc

The market continued firm all week, with the price unchanged at 7.50c. a lb., East St. Louis. Demand was active, and buying for forward delivery resulted in total sales for the week of around 10,000 tons in ordinary grades. Shipments were approximately 5800 tons. Contrary to weakness in other metals, zinc has remained strong due to its tight statistical position.

Tin

Weakness in tin abroad reacted on the market here during the week. Profit taking by speculators was felt, and depressed prices. The New York spot Straits quotation accordingly dropped to 62.00c. a lb. yesterday, but rebounded to about 64.00c. today as liquidators expended themselves and London improved. There was little or no buying during the week by consumers. In London this morning standard metal was quoted at £285 spot and £279 5s. futures. The Eastern price was £277 15s.

The Week's Prices. Cents Per Pound for Early Delivery

	Mar. 17	Mar. 18	Mar. 19	Mar. 20	Mar. 22	Mar. 23
Electrolytic copper, Conn.*	16.25	16.25	16.25	16.25	16.25	16.25
Lake copper, N. Y.	16.37 ½	16.37 ½	16.37 ½	16.37 ½	16.37 ½	16.37 ½
Straits tin, spot, New York	65.25	66.00	64.12 ½	62.00	64.00	64.00
Zinc, East St. Louis	7.50	7.50	7.50	7.50	7.50	7.50
Zinc, New York	7.85	7.85	7.85	7.85	7.85	7.85
Lead, St. Louis	7.10	7.10	6.85	6.85	6.85	6.80
Lead, New York	7.25	7.25	7.00	7.00	7.00	6.95

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
†Nominal.

Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb. delivered.

Aluminum No. 12 remelt No. 2 standard, in clearloads, 19.00c. to 19.50c. a lb. delivered.

Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.

Antimony, Asiatic, 17.00c. a lb., New York.

Quicksilver, \$91.00 to \$92.00 per flask of 76 lb.

Brass ingots, commercial 85-5-5-5, 17.25c. a lb. delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse Delivered Prices, Base per Lb.

Tin, Straits pig	63.50c. to 64.50c.
Tin, bar	65.50c. to 66.50c.
Copper, Lake	18.00c. to 19.00c.
Copper, electrolytic	18.00c. to 19.00c.
Copper, castings	17.75c. to 18.75c.
*Copper sheets, hot-rolled	23.87 ½c.
*High brass sheets	21.25c.
*Seamless brass tubes	24.00c.
*Seamless copper tubes	24.62 ½c.
*Brass rods	17.62 ½c.
Zinc, slabs	7.75c. to 8.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	12.75c.
Lead, American pig	7.75c. to 8.75c.
Lead, bar	8.75c. to 9.75c.
Lead, sheets, cut	10.50c.
Antimony, Asiatic	18.00c. to 19.00c.
Alum., virgin, 99 per cent plus	24.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, ½ and ½	40.00c. to 42.00c.
Babbitt metal, commercial grades	25.00c. to 65.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33 ¼ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse Delivered Prices per Lb.

Tin, Straits pig	66.25c.
------------------	---------

Tin, bar	68.25c.
Copper, Lake	17.00c. to 17.25c.
Copper, electrolytic	17.00c. to 17.25c.
Copper, castings	16.75c. to 17.00c.
Zinc, slabs	8.75c. to 9.00c.
Lead, American pig	7.50c. to 7.75c.
Lead, bar	11.00c.
Antimony, Asiatic	18.75c.
Babbitt metal, medium grade	25.50c.
Babbitt metal, high grade	70.25c.
Solder, ½ and ½	40.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	13.37 ½c.	14.12 ½c.
Copper, hvy. and wire	13.25c.	13.75c.
Copper, light and bottoms	12.25c.	12.50c.
Brass, heavy	8.25c.	8.87 ½c.
Brass, light	6.50c.	7.25c.
Hvy. machine composition	11.75c.	12.25c.
No. 1 yel. brass turnings	8.62 ½c.	9.12 ½c.
No. 1 red brass or compos. turnings	11.12 ½c.	11.62 ½c.
Lead, heavy	6.12 ½c.	6.50c.
Cast aluminum	12.12 ½c.	13.25c.
Sheet aluminum	13.25c.	14.75c.
Zinc	4.25c.	4.62 ½c.



IRON AND STEEL SCRAP

... All principal markets higher; composite up to \$21.75.

... Export congestion may ease domestic scarcity somewhat.

MARCH 23.—With steel-making activity showing further increases, the scrap markets all over the country continue to establish additional price advances or, in certain instances, a more pronounced bullish undertone. No. 1 steel has been sold at levels 50c. higher than a week ago at Pittsburgh, Chicago and in eastern Pennsylvania. These changes are reflected in a 50c. rise in the composite figure to \$21.75 a gross ton, the highest average quotation for scrap since April, 1923. With scrap prices so high, there is naturally some resistance on the part of consumers. However, even though quotations appear to be leveling off to some extent, there is still no firm indication that the absolute top has been reached for the current move. Whereas domestic buyers are bemoaning the scarcity of offers, exporters continue to be embarrassed by too much scrap. In the absence of sufficient boats to clear docks, certain railroads continue to limit the number of cars available for storing supplies at Port Richmond, Philadelphia, and at Boston.

Pittsburgh

The market continues strong, although the rapid rises prevalent a few weeks ago have slowed up to some extent. No. 1 steel has moved up 50c., following sales made into consumption at \$24. Within the past week there has been some resistance to high scrap prices, but on the other hand mills badly in need of steel have paid current quotations. It is the opinion in some quarters that the railroad embargoes in the East will result in a freer movement of scrap from that point into this district, but it is not expected that the amount will reach large proportions. Scrap is still far from plentiful, and dealers with shortages are not having an easy time covering. More important than the foreign situation is the fact that local steel-making schedules are the highest in the past six years, and there seems little evidence that the operating rates will be much lower over the next three months.

Chicago

Notwithstanding scattered attempts to talk some weakness into the market, there is not a single economic factor that points in any direction except that of added strength. Recent buying leaves brokers heavily obligated to mills. Current high prices have induced a better flow, but mill consumption has kept pace and mill restrictions are but meaningless scraps of paper. The Rock Island and the Illinois Central have disposed of large lists, and practically all grades they offered brought new high prices.

Cleveland

The market has made another advance of \$1 a ton on steel-making grades in both Cleveland and the Valley districts and 50c. a ton locally on blast furnace grades. The higher prices on steel-making scrap are based on sales to consumers. A Cleveland steel plant has purchased a moderate tonnage of heavy melting steel, paying \$21.50 for No. 1 and \$20 for No. 2. Brokers are paying \$21 to cover against this order. A Valley district consumer purchased a small tonnage of No. 2 steel at a reported price of \$22. Dealers are paying as high as \$15 for blast furnace scrap for Cleveland delivery.

Philadelphia

Increased mill activity has resulted in price advances throughout the list this week, No. 1 steel being quoted at \$20 to \$20.50, and No. 2, \$18.50 to \$19. Permits must be secured for every car of scrap shipped into Port Richmond today, and the only means of obtaining such a permit is to have a boat waiting for the particular car for which the license is issued. On an average, three boats a week are clearing this port, but there are still about 800 cars remaining on tracks waiting for additional boat space. At present, only No. 1 and No. 2 steel and old bundles are being shipped abroad.

New York

The market here continues to show very noticeable strength, and prices paid by dealers for heavy melting steel have been adjusted upward to conform to the existing situation. The current range quoted on this material is there-

fore \$17 to \$17.50 a gross ton for both domestic and export shipment. Other grades are little changed from last week. At prevailing prices supplies are coming out freely, but demand is more than sufficient to absorb all offerings.

Buffalo

Reliable reports of another sale of No. 1 steel at \$21 and No. 2 at \$19 to \$19.50, coupled with considerable selling of miscellaneous grades, again have strengthened the entire list. Sales of the No. 1 cast grade at \$19 to \$20 and No. 1 cupola at \$18.50 to \$19 are reported, with the heavy material said to be very scarce and in heavy demand. Stove plate has been sold on the basis of \$16, Buffalo. High export prices will prevent the shipping of scrap into Buffalo from many barge canal points, and a shortage looms. Specialties are very strong and scarce.

Boston

American Steel & Wire Co., Worcester, is in the market for 6000 to 7000 tons and possibly more of No. 1 and No. 2 steel. For shipment there, brokers are paying \$17.50 a ton for No. 1 steel delivered, and \$16.00 a ton for No. 2, these prices being in line with export quotations. Exporters are concentrating on cleaning up demurrage lots on dock here. Clearing of docks by April 1, as anticipated a week ago, now appears improbable. Railroads, in dire need of cars, intimate they will maintain stiff demurrage charges after April 1, and control shipments to seaboard by a "permit to ship" policy.

Detroit

The market this week was the quietest since scrap prices began rising. The current lull, however, is considered merely a breathing spell and does not portend a softening in prices. Prolonged labor difficulty in the automotive field has exercised a psychological effect, thus slowing the pace generally. However, most of the inactivity can be blamed on a lack of scrap with Chrysler producing none because of strikes. Complete mystery surrounds the disposal price of 230 carloads of hydraulic bundles sold a week ago, although a rumored price of \$20 a ton might have an appreciable effect on the market. The two most active items of the week were low phos plate scrap and borings and turnings.

St. Louis

The market for scrap iron continues strong in St. Louis, although dealers have made no changes in their prices. There were no sales to the mills. Pending railroad lists include 1200 tons for the Missouri-Kansas-Texas and 90 carloads for the Missouri Pacific.

Cincinnati

Sales of scrap tend upward as several interests report contracts for substantial tonnages. Dealers' bids are advanced again as the trade bids strongly for available material. All grades of old materials are in demand, and mill apathy is disappearing in the face of improved steel demand.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$23.50 to \$24.00
Railroad hvy. mltng.	24.00 to 24.50
No. 2 hvy. mltng. steel.	20.00 to 20.50
No. 2 RR. wrought	23.50 to 24.00
Scrap rails	24.50 to 25.00
Rails 3 ft. and under	26.50 to 27.00
Comp. sheet steel	23.50 to 24.00
Hand. bundled sheets	21.00 to 21.50
Hvy. steel axle turn.	21.75 to 22.25
Machine shop turn.	14.50 to 15.00
Short shov. turn.	15.50 to 16.00
Mixed bor. & turn.	14.00 to 14.50
Cast iron borings	14.50 to 15.00
Cast iron carwheels	19.50 to 20.00
Hvy. breakable cast.	16.00 to 16.50
No. 1 cast	19.50 to 20.00
RR. knuckles & cplrs.	27.00 to 27.50
Rail coil & leaf springs	27.00 to 27.50
Rolled steel wheels	27.00 to 27.50
Low phos. billet crops	27.50 to 28.00
Low phos. sh. bar	27.00 to 27.50
Low phos. punchings	25.00 to 25.50
Low phos. plate, hvy.	26.50 to 27.00
Low phos. plate clip.	25.00 to 25.50
Steel car axles	26.00 to 26.50

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$21.00 to \$21.50
No. 2 hvy. mltng. steel.	19.50 to 20.00
Comp. sheet steel	20.00 to 20.50
Light bund. stampings	16.50 to 17.00
Drop forge flashings	19.50 to 20.00
Machine shop turn.	13.50 to 14.00
Short shov. turn.	15.00 to 15.50
No. 1 busheling	20.00 to 20.50
Steel axle turnings	17.50 to 18.00
Low phos. billet and bloom crops	26.00 to 26.25
Cast iron borings	14.50 to 15.00
Mixed bor. & turn.	14.50 to 15.00
No. 2 busheling	14.50 to 15.00
No. 1 cast	20.50 to 21.00
Railroad grate bars	12.00 to 12.50
Stove plate	10.00 to 10.50
Rails under 3 ft.	24.50 to 25.00
Rails for rolling	21.50 to 22.00
Railroad malleable	21.00 to 21.50
Cast iron carwheels	18.50 to 19.00

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$20.00 to \$20.50
No. 2 hvy. mltng. steel.	18.50 to 19.00
Hydraulic bund., new.	19.00 to 19.50
Hydraulic bund., old.	17.00
Steel rails for rolling	22.00 to 23.00
Cast iron carwheels	20.00
Hvy. breakable cast	19.50
No. 1 cast	22.00 to 22.50
Stove plate (steel wks.)	16.50
Railroad malleable	19.50 to 20.00
Machine shop turn.	14.00 to 14.50
No. 1 blast furnace	13.50 to 14.00
Cast borings	13.50 to 14.00
Heavy axle turnings	18.00 to 18.50
No. 1 low phos. hvy.	25.00 to 25.50
Couplers & knuckles	25.00 to 25.50
Rolled steel wheels	25.00 to 25.50
Steel axles	25.00 to 25.50
Shafting	24.00 to 24.50
No. 1 RR. wrought	20.00
Spec. iron & steel pipe	17.50 to 18.00
No. 1 forge fire	17.50 to 18.00
Cast borings (chem.)	13.50 to 14.00

CHICAGO

Delivered to Chicago district consumers:	
Per Gross Ton	
Hvy. mltng. steel	\$21.00 to \$21.50
Auto. hvy. mltng. steel	19.00 to 19.50
Alloy free	18.50 to 19.00
Shoveling steel	21.00 to 21.50
Hydraul. comp. sheets	20.00 to 20.50
Drop forge flashings	16.50 to 17.00
No. 1 busheling	18.00 to 18.50
Rolled carwheels	23.00 to 23.50
Railroad tires, cut	23.00 to 23.50
Railroad leaf springs	23.00 to 23.50
Steel coup. & knuckles	23.00 to 23.50
Axle turnings	19.00 to 19.50
Coil springs	25.50 to 26.00
Axle turn. (elec.)	21.00 to 21.50
Low phos. punchings	23.50 to 24.00
Low phos. plates, 12 in. and under	23.50 to 24.00
Cast iron borings	12.75 to 13.25
Short shov. turnings	12.75 to 13.25
Machine shop turn.	11.50 to 12.00
Rerolling rails	23.50 to 24.00
Steel rails under 3 ft.	23.25 to 23.75
Steel rails under 2 ft.	25.00 to 25.50
Angle bars, steel	23.50 to 24.00
Cast iron carwheels	21.00 to 21.50
Railroad malleable	23.00 to 23.50
Agric. malleable	18.75 to 19.25
Iron car axles	26.50 to 27.00

Per Net Ton

Steel car axles	\$24.50 to \$25.00
No. 1 RR. wrought	18.75 to 19.25
No. 2 RR. wrought	18.75 to 19.25
No. 2 busheling, old.	9.00 to 9.50
Locomotive tires	19.50 to 20.00
Pipes and flues	14.50 to 15.00
No. 1 machinery cast.	17.50 to 18.00
Clean auto. cast	16.50 to 17.00
No. 1 railroad cast	16.75 to 17.25
No. 1 agric. cast	14.00 to 14.50
Stove plate	12.25 to 12.75
Grate bars	13.50 to 14.00
Brake shoes	13.50 to 14.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mltng. steel.	\$20.50 to \$21.00
No. 2 hvy. mltng. steel.	19.00 to 19.50
Scrap rails	20.50 to 21.00
New hvy. b'ndled sheet	19.00 to 19.50
Old hydraul. bundles	18.00 to 18.50
Drop forge flashings	19.00 to 19.50
No. 1 busheling	19.00 to 19.50
Hvy. axle turnings	15.50 to 16.00
Machine shop turn.	14.50 to 15.00
Knuckles & couplers	23.50 to 24.00
Coil & leaf springs	23.50 to 24.00
Rolled steel wheels	23.50 to 24.00
Low phos. billet crops	23.50 to 24.50
Shov. turnings	15.50 to 16.00
Mixed bor. & turn.	13.50 to 14.00
Cast iron borings	13.50 to 14.00
Steel car axles	22.00 to 22.50
No. 1 machinery cast.	19.50 to 20.00
No. 1 cupola cast.	18.50 to 19.00
Stove plate	15.50 to 16.00
Steel rails under 3 ft.	24.00 to 25.00
Cast iron carwheels	19.00 to 19.50
Railroad malleable	21.50 to 22.50
Chemical borings	14.50 to 15.00

BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	\$15.00 to \$18.00
Scrap steel rails	17.00 to 19.00
Short shov. turnings	9.00 to 10.00
Stove plate	9.00 to 10.50
Steel axles	18.00 to 19.00
Iron axles	16.50 to 18.00
No. 1 RR. wrought	13.00 to 15.00
Rails for rolling	18.00 to 20.00
No. 1 cast	16.00 to 18.00
Tramcar wheels	16.00 to 17.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:	
Selected hvy. steel	\$18.50 to \$19.00
No. 1 hvy. melting	18.00 to 18.50
No. 2 hvy. melting	16.00 to 16.50
No. 1 locomotive tires	20.00 to 20.50
Misc. stand.-sec. rails	19.00 to 19.50
Railroad springs	21.50 to 22.00
Bundled sheets	11.00 to 11.50
No. 2 RR. wrought	18.00 to 18.50
No. 1 busheling	14.00 to 14.50
Cast bor. & turn.	7.50 to 8.00
Rails for rolling	20.00 to 20.50
Machine shop turn.	9.00 to 9.50
Heavy turnings	14.00 to 14.50
Steel car axles	21.50 to 22.00
Iron car axles	22.00 to 22.25
No. 1 RR. wrought	15.50 to 16.00
Steel rails under 3 ft.	20.00 to 20.50
Steel angle bars	19.25 to 19.75
Cast iron carwheels	19.00 to 19.50
No. 1 machinery cast.	15.00 to 15.50
Railroad malleable	19.50 to 20.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricul. malleable	12.50 to 13.00
Grate bars	12.00 to 12.50
Brake shoes	13.50 to 14.00

CINCINNATI

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$18.50 to \$19.00
No. 2 hvy. mltng. steel.	16.50 to 17.00
Scrap rails for mltng.	21.50 to 22.00
Loose sheet clippings	14.00 to 14.50
Bundled sheets	16.00 to 16.50
Cast iron borings	11.50 to 12.00
Machine shop turn.	12.25 to 12.75
No. 1 busheling	15.50 to 16.00
No. 2 busheling	10.00 to 10.50
Rails for rollings	22.50 to 23.00
No. 1 locomotive tires	17.50 to 18.00
Short tails	23.50 to 24.00
Cast iron carwheels	18.50 to 19.00
No. 1 machinery cast.	18.00 to 18.50
No. 1 railroad cast	17.00 to 17.50
Burnt cast	12.50 to 13.00
Stove plate	12.50 to 13.00
Agricul. malleable	18.00 to 18.50
Railroad malleable	19.50 to 20.00

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$17.75 to \$18.25
No. 2 hvy. mltng. steel.	16.75 to 17.25
Borings and turnings	13.50 to 14.00
Long turnings	13.50 to 14.00
Short shov. turnings	14.50 to 15.00
No. 1 machinery cast.	17.25 to 17.75
Automotive cast	18.50 to 19.00
Hydraul. comp. sheets	19.25 to 19.75
Stove plate	11.25 to 11.75
New factory bushel.	17.50 to 18.00
Old No. 2 busheling	11.75 to 12.25
No. 2 busheling (black fender stock)	13.00 to 13.50
Sheet clippings	14.00 to 14.50
Flashings	16.00 to 16.50
Low phos. plate scrap.	19.00 to 19.50

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$22.50 to \$23.00
Hydraulic bundles	22.00 to 22.50
Machine shop turn	15.50 to 16.00

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$17.00 to \$17.50
No. 2 hvy. mltng. steel.	15.50 to 16.00
Hvy. breakable cast.	15.00 to 15.50
No. 1 machinery cast.	16.75 to 17.25
No. 2 cast	15.00 to 15.50
Stove plate	11.50 to 12.00
Steel car axles	25.00 to 26.00
Shafting	20.00 to 20.50
No. 1 RR. wrought	17.50 to 18.00
No. 1 wrought long.	16.50 to 17.00
Spec. iron & steel pipe	14.50 to 15.00
Rails for rolling	18.50 to 19.00
Clean steel turnings	8.75 to 9.25
Cast borings	8.75 to 9.00
No. 1 blast furnace	8.75 to 9.00
Cast borings (chem.)	11.00 to 11.50
Unprepar. yard scrap.	10.50 to 11.00
Per gross ton, delivered local foundries:	
No. 1 machn. cast.	\$18.00 to \$18.50
No. 1 hvy. cast cupola.	15.50 to 16.00
No. 2 cast	14.50 to 15.00
Add 50c. to 75c. to above quotations to secure North Jersey prices.	

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$16.30 to \$16.80
Scrap rails	16.30 to 16.80
No. 2 steel	15.25 to 15.75
Breakable cast	14.00 to 14.50
Machine shop turn	9.75 to 9.30
Mixed bor. & turn.	7.50 to 8.30
Bund. skeleton long.	13.40 to 13.50
Shafting	18.50 to 19.00
Cast bor. chemical	9.50 to 10.25
Per gross ton delivered consumers' yards:	
Textile cast	\$17.00 to \$19.00
No. 1 machine cast.	17.00 to 19.00
Stove plate	10.00 to 10.50

CANADA

Dealers' buying prices at their yards, per gross ton

Toronto Montreal	
No. 1 hvy. mltng. stl.	\$13.50 \$13.00
No. 2 hvy. mltng. stl.	12.50 12.00
Mixed dealers steel	12.00 11.75
Scrap pipe	10.25 9.75
Steel turnings	9.00 8.50
Cast borings	9.75 9.50
Machinery cast	17.50 17.00
Dealers cast	15.50 15.00
Stove plate	13.00 12.75

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges.	
No. 1 hvy. mltng. steel.	\$17.00 to \$17.50
No. 2 hvy. mltng. steel.	16.00 to 16.50
No. 2 cast	15.00 to 15.50
Stove plate	12.00 to 12.25
Steel rails (scrap)	17.50 to 18.00
Boston on cars at Army Base or West Wharf	
No. 1 hvy. mltng. steel.	\$17.00
No. 2 hvy. mltng. steel.	16.00
Rails (scrap)	17.00
Stove plate	\$12.50 to 13.00
No. 2 cast	14.75 to 15.00
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel.	\$18.50
No. 2 hvy. mltng. steel.	17.50
New Orleans, f.a.s., Stuyvesant Dock	
No. 1 hvy. mltng. steel.	\$17.50
No. 2 hvy. mltng. steel.	16.50
Los Angeles, on cars or trucks at local piers	
No. 1 hvy. mltng. steel.	\$10.50 to \$11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton
Rerolling\$37.00
Forging quality 43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open-hearth or Bessemer\$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared2.10c.

Wire Rods (No. 5 to 9/32 in.)

Per Gross Ton
F.o.b. Pittsburgh or Cleveland.....\$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind. 48.00
F.o.b. Worcester, Mass. 49.00
F.o.b. Birmingham 50.00
F.o.b. San Francisco 56.00
F.o.b. Galveston 53.00
Rods over 9/32 in. to 47/64 in., inclusive, \$5 a ton over base.

BARs, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.
F.o.b. Pittsburgh 2.45c.
F.o.b. Chicago or Gary 2.50c.
F.o.b. Duluth 2.60c.
Del'd Detroit 2.60c.
F.o.b. Cleveland 2.50c.
F.o.b. Buffalo 2.55c.
Del'd Philadelphia 2.74c.
Del'd New York 2.78c.
F.o.b. Birmingham 2.60c.
F.o.b. cars dock Gulf ports... 2.85c.
F.o.b. cars Pacific ports 3.00c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 2.30c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill. 2.35c.
F.o.b. Buffalo 2.40c.
F.o.b. Birmingham 2.45c.
F.o.b. cars dock Gulf ports... 2.70c.
F.o.b. cars dock Pacific ports.. 2.85c.

Billet Steel Reinforcing (Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.55c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.60c.
Del'd Detroit 2.70c.
F.o.b. cars dock Gulf ports... 2.95c.
F.o.b. cars dock Pacific ports.. 2.95c.

Rail Steel Reinforcing (Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.40c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.45c.
F.o.b. cars dock Gulf ports... 2.80c.
F.o.b. cars dock Pacific ports.. 2.80c.

Iron

F.o.b. Chicago
F.o.b. Pittsburgh (refined) 3.60c.

Cold Finished Bars and Shafting*

Base per Lb.
F.o.b. Pittsburgh 2.90c.
F.o.b. Cleveland, Chicago and Gary 2.95c.
F.o.b. Buffalo 3.00c.
F.o.b. Detroit 2.95c.

* In quantities of 10,000 to 10,999 lb.

Plates

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago or Gary 2.30c.
Del'd Cleveland 2.435c.
F.o.b. Coatesville or Spar. Pt. 2.35c.
Del'd Philadelphia 2.435c.
Del'd New York 2.53c.
F.o.b. Birmingham 2.40c.

F.o.b. cars dock Gulf ports... 2.65c.
F.o.b. cars dock Pacific ports.. 2.80c.
Wrought iron plates, f.o.b. Pittsburgh 3.80c.

Floor Plates

F.o.b. Pittsburgh 3.80c.
F.o.b. Chicago 3.85c.
F.o.b. Coatesville 3.90c.
F.o.b. cars dock Gulf ports... 4.20c.
F.o.b. cars dock Pacific ports.. 4.35c.

Structural Shapes

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago 2.30c.
Del'd Cleveland 2.435c.
F.o.b. Buffalo or Bethlehem.. 2.35c.
Del'd Philadelphia 2.455c.
Del'd New York 2.505c.
F.o.b. Birmingham (standard) 2.40c.
F.o.b. cars dock Gulf ports... 2.65c.
F.o.b. cars dock Pacific ports.. 2.80c.

Steel Sheet Piling

Base per Lb.
F.o.b. Pittsburgh 2.60c.
F.o.b. Chicago or Buffalo 2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports 3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton\$42.50
Angle bars, per 100 lb. 2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton\$43.00
Light rails (from rail steel) per gross ton 42.00

Base per Lb.

Spikes 3.15c.
Tie plates, steel 2.30c.
Tie plates, Pacific Coast ports.. 2.40c.
Track bolts, to steam railroads. 4.35c.
Track bolts, to jobbers, all sizes (per 100 counts)

65-5 per cent off list
Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

Base per Lb.
No. 10, f.o.b. Pittsburgh 2.40c.
No. 10, f.o.b. Gary 2.50c.
No. 10, del'd Detroit 2.60c.
No. 10, del'd Philadelphia 2.69c.
No. 10, f.o.b. Birmingham 2.55c.
No. 10, f.o.b. cars dock Pacific ports 2.90c.
No. 10 wrought iron, Pgh. 4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh 3.15c.
No. 24, f.o.b. Gary 3.25c.
No. 24, del'd Detroit 3.35c.
No. 24, del'd Philadelphia 3.44c.
No. 24, f.o.b. Birmingham 3.30c.
No. 24, f.o.b. cars dock Pacific ports 3.80c.
No. 24 wrought iron, Pitts-burgh 5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh.. 3.10c.
No. 10 gage, f.o.b. Gary 3.20c.
No. 10 gage, f.o.b. Detroit 3.30c.
No. 10 gage, del'd Philadelphia.. 3.39c.
No. 10 gage, f.o.b. Birmingham.. 3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports 3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh.. 3.55c.
No. 20 gage, f.o.b. Gary 3.65c.
No. 20 gage, del'd Detroit 3.75c.
No. 20 gage, del'd Philadelphia.. 3.84c.
No. 20 gage, f.o.b. Birmingham.. 3.70c.
No. 20 gage, f.o.b. cars, dock, Pacific ports 4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh.. 3.80c.
No. 24, f.o.b. Gary 3.90c.
No. 24, del'd Philadelphia 4.09c.
No. 24, f.o.b. Birmingham 3.95c.
No. 24, f.o.b. cars, dock, Pacific ports 4.40c.
No. 24 wrought iron, Pitts-burgh 6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.

Field grade 3.35c.
Armature 3.70c.
Electrical 4.20c.
Special Motor 5.10c.
Special Dynamo 5.80c.
Transformer 6.30c.
Transformer Special 7.30c.
Transformer Extra Special 7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.
Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh 4.10c.
F.o.b. Gary 4.20c.
F.o.b. cars, dock, Pacific ports 4.70c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh 3.50c.
No. 20, f.o.b. Gary 3.60c.
No. 20, f.o.b. Birmingham 4.10c.
No. 20, f.o.b. cars dock Pacific ports 4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb. 3.30c.
No. 28, Gary 3.40c.
No. 28, cars dock Pacific ports, boxed 4.175c.

Tin Plate

Base per Box

Standard cokes, f.o.b. Pittsburgh district mill\$4.85
Standard cokes, f.o.b. Gary 4.95

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

Special Coated Manufacturing Ternes

Per Base Box

F.o.b. Pittsburgh\$4.15
F.o.b. Gary 4.25

* Customary 7½ per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)
8-lb. coating I.C.\$11.00
15-lb. coating I.C. 13.00
20-lb. coating I.C. 14.00
25-lb. coating I.C. 15.00
30-lb. coating I.C. 16.25
40-lb. coating I.C. 18.50

Hot-Rolled Hoops, Bands, Strip and Flats under ¼ in.

Base per Lb.

All widths up to 24 in., Pittsburgh 2.40c.
All widths up to 24 in., Chicago 2.50c.
All widths up to 24 in., del'd Detroit 2.60c.
All widths up to 24 in., Birmingham 2.55c.
Cooperage stock, Pittsburgh... 2.50c.
Cooperage stock, Chicago 2.60c.

Cold-Rolled Strip*

Base per Lb.

F.o.b. Pittsburgh 3.20c.
F.o.b. Cleveland 3.20c.
Del'd Chicago 3.48c.
F.o.b. Worcester 3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

Pittsburgh and Cleveland Worcester

Carbon	0.25-0.50%	3.20c.	3.40c.
Carbon	.51-.75	4.45c.	4.65c.
Carbon	.76-1.00	6.30c.	6.50c.
Carbon	Over 1.00	8.50c.	8.70c.

Fender Stock

No. 14, Pittsbg'h or Cleveland 3.45c.
No. 20, Pittsbg'h or Cleveland. 3.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)
To Manufacturing Trade

Per Lb.
Bright wire2.90c.
Spring wire3.50c.
Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade
Base per Keg
Standard wire nails2.75c.
Smooth coated nails2.75c.
Base per 100 Lb.
Annealed fence wire\$3.20
Galvanized fence wire3.60
Polished staples3.45
Galvanized staples3.70
Barbed wire, galvanized3.40
Twisted barbed wire3.40

Per Net Ton
Woven wire fence, base column... 74
Single loop bale ties, base col... 63
Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh, except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.
On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.
On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe
Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Steel		Wrought Iron	
In.	Black Galv.	In.	Black Galv.
1/4	52 31	1/4 & 1/2	+6 +26
1/4 to 1/2	55 38 1/2	1/2	27 10 1/2
1/2	59 49	1/2	32 16
3/4	62 53	1 & 1 1/4	35 21
1 to 3	64 55	1 1/2	39 23 1/2
		2	38 23
Lap Weld		Lap Weld	
2	57 47 1/2	2	32 18
2 1/2 & 3	60 50 1/2	2 1/2 to 3 1/2	33 20 1/2
3 1/2 to 6	62 52 1/2	4 to 8	35 24
7 & 8	61 50 1/2	9 to 12	28 15
9 & 10	60 50		
11 & 12	59 49		
Butt Weld, extra strong, plain ends		Butt Weld, extra strong, plain ends	
1/4	50 36 1/2	1/4 & 1/2	+7 +39
1/4 to 1/2	52 40 1/2	1/2	28 13
1/2	57 48 1/2	1	33 18
3/4	61 52 1/2	1 to 2	39 24 1/2
1 to 3	63 55		
Lap Weld, extra strong, plain ends		Lap Weld, extra strong, plain ends	
2	55 46 1/2	2	35 21 1/2
2 1/2 & 3	59 50 1/2	2 1/2 to 4	41 28 1/2
3 1/2 to 6	62 54	4 1/2 to 6	40 28
7 & 8	61 51	7 & 8	41 28 1/2
9 & 10	60 50	9 to 12	32 20 1/2
11 & 12	59 49		

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes
Seamless Steel Commercial Boiler Tubes and Locomotive Tubes
(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold Drawn	Hot Rolled
1 in. o.d. 13 B.W.G.	\$ 9.46	\$ 8.41
1 1/4 in. o.d. 13 B.W.G.	11.21	9.96
1 1/2 in. o.d. 13 B.W.G.	12.38	11.00
1 3/4 in. o.d. 13 B.W.G.	14.09	12.51
2 in. o.d. 13 B.W.G.	15.78	14.02
2 1/4 in. o.d. 13 B.W.G.	17.60	15.43
2 1/2 in. o.d. 12 B.W.G.	19.37	17.21
2 3/4 in. o.d. 12 B.W.G.	21.22	18.85
3 in. o.d. 12 B.W.G.	22.49	19.98
3 1/4 in. o.d. 12 B.W.G.	23.60	20.97
3 1/2 in. o.d. 10 B.W.G.	43.19	40.15
3 3/4 in. o.d. 11 B.W.G.	29.79	26.47
4 in. o.d. 10 B.W.G.	36.96	32.83
5 in. o.d. 9 B.W.G.	56.71	50.38
6 in. o.d. 7 B.W.G.	87.07	77.35

Extra for less-carload quantities:
25,000 lb. or ft. to 39,999 lb. or ft. 5 %
12,000 lb. or ft. to 24,999 lb. or ft. 12 1/2 %
6,000 lb. or ft. to 11,999 lb. or ft. 25 %
2,000 lb. or ft. to 5,999 lb. or ft. 35 %
Under 2,000 lb. or ft.50 %

CAST IRON WATER PIPE

Per Net Ton
*6-in. and larger, del'd Chicago \$50.00
6-in. and larger, del'd New York 53.00
*6-in. and larger, Birmingham 42.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles... 56.00
F.o.b. dock, Seattle..... 56.00
4-in., f.o.b. dock, San Francisco or Los Angeles 59.00
F.o.b. dock, Seattle 59.00

Class "A" and gas pipe, \$3 extra.
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$41, Birmingham, and \$49.50, delivered Chicago; and 4-in. pipe, \$44, Birmingham, and \$52.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List
Machine and carriage bolts:
1/2 in. x 6 in. and smaller .65 and 5*
Larger and longer up to
1 in.60 and 10*
1 1/2 in. and larger60 and 5*
Lag bolts60 and 10*
Plow bolts, Nos. 1, 2, 3, and 765 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex, blank or tapped:
1/2 in. and smaller65 and 5*
3/16 in. to 1 in. inclusive .60 and 10*
1 1/2 in. and larger60 and 5*

Jobbers discount on above items, 5 per cent.

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:

1/2 in. and smaller60 and 20
3/16 in. to 1 in. inclusive .60 and 15
1 1/2 in. and larger60 and 12 1/2
Stove bolts in packages, nuts attached72 1/2
Stove bolts in packages, with nuts separate72 1/2 and 5
Stove bolts in bulk81 1/2
On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets
(1/2-in. and larger)
Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland..\$3.60
F.o.b. Chicago or Birmingham.. 3.70

Small Rivets
(7/16-in. and smaller)
Per Cent Off List
F.o.b. Pittsburgh 70
F.o.b. Cleveland 70
F.o.b. Chicago and Birmingham.. 70

Cap and Set Screws
(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller 75
Milled headless set screws, cut thread 3/4 in. and smaller..... 75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller 60
Upset set screws, cup and oval points 75
Milled studs 65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$60 a gross ton.

Alloy Steel Bars
F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base.....3.00c.
Delivered, Detroit3.15c.
S.A.E.

Alloy Differential
Numbers
2000 (1 1/4% Nickel)\$0.35
2100 (1 1/2% Nickel) 0.75
2300 (3 1/2% Nickel) 1.55
2500 (5% Nickel) 2.25
3100 Nickel-chromium 0.70

3200 Nickel-chromium \$1.35
3300 Nickel-chromium 3.30
3400 Nickel-chromium 3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum). 0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum). 0.75
4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni). 1.10
5100 Chrome steel (0.60-0.90 Cr.) 0.35
5100 Chrome steel (0.80-1.10 Cr.) 0.45
5100 Chromium spring steel.... 0.15
6100 Chromium-vanadium bar... 1.20
6100 Chromium-vanadium spring steel 0.85
Chromium-nickel-vanadium ... 1.50
Carbon-vanadium 0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars
F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel
No. 304
Forging billets21 2/5c. 20.40c.
Bars 25c. 24c.
Plates 29c. 27c.
Structural shapes.. 25c. 24c.
Sheets 36c. 34c.
Hot-rolled strip... 23 1/4c. 21 1/4c.
Cold-rolled strip... 30c. 28c.
Drawn wire 25c. 24c.

Straight Chrome
No. No. No. No.
410 430 442 446
Bars18 1/4c. 19c. 22 1/4c. 27 1/4c.
Plates ..21 1/4c. 22c. 25 1/4c. 29 1/4c.
Sheets ..26 1/4c. 29c. 32 1/4c. 36 1/4c.
Hot strip 17c. 17 1/4c. 23c. 28c.
Cold stp..22c. 22 1/4c. 28 1/4c. 36 1/4c.

TOOL STEEL

Base Per Lb.
High speed 67c.
High-carbon-chrome 43c.
Oil-hardening 24c.
Special 22c.
Extra 18c.
Regular 14c.
Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports
Ferromanganese, export£10 7s. 6d.
Billets, open-hearth£7 7s. 6d. to £7 12s. 6d.
Tin plate, per base box 13s 9d to 23s. 6d.
Steel bars, open-hearth..£9 5s.
Beams, open-hearth... £9 12s. 6d.
Channels, open-hearth £9 17s. 6d.
Angles, open-hearth ... £9 12s. 6d.
Black sheets, No. 24 gage£13 14s. 6d.
Galvanized sheets, No. 24 gage£17 4s. 6d.

CONTINENTAL

Per Metric Ton, Gold £, f.o.b. Continental Ports

Current dollar equivalent is ascertained by multiplying gold pound prices by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.
Billets, Thomas£3 4s. 6d.
Wire rods, No. 5 B.W.G...£4 10s.
Steel bars, merchant....£5
Sheet bars£2 15s. 6d.
Plate 1/4 in. and up.....£7 9s.
Plate 3/16 in. and 5 mm..£5 15s.
Sheet, 1/4 in.£6 5s.
Beams, Thomas£3 2s. 6d.
Angles (Basic)£3 2s. 6d.
Hoops and strip, base....£4
Wire, plain, No. 8.....£5 7s. 6d.
Wire nails£5 15s.
Wire, barbed, 4 pt. No. 10 B.W.G.£8 15s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.70c.
Structural shapes	3.70c.
Soft steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$4.48
Spikes, large	1 to 24 kegs 3.90c.

	Per Cent Off List
Track bolts, all sizes, per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	\$4.35
Wire, black, soft ann'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg.	3.00c.
Cement coated nails, per keg.	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

**Prices on application.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.10c.
Cold-fin. steel bars	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	3.95c.
Hot-rolled annealed sheets (No. 24)	4.35c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	4.40c.
Track bolts (keg lots)	5.60c.
Rivets, structural (keg lots)	4.60c.
Rivets, boiler (keg lots)	5.10c.

	Per Cent Off List
Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	60
Cut point set screws	75 and 10
Flat head bright wood screws	62 and 20
Spring cotters	55
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	\$4.00 off list
Black ann'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	\$4.55
Com. wire nails, 15 kegs or more	Prices on application
Cement c'd nails, 15 kegs or more	Prices on application

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. char.	
coal	6.50c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.

Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.
Bands	4.32c.
Hot-rolled sheets (No. 10)	4.07c.
Hot-rolled ann'd sheets (No. 24*)	4.82c.
Galvanized sheets (No. 24*)	5.72c.
Long terme sheets (No. 24)	6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, ½ in. and heavier	5.90c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.35c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x ½ in. and larger	4.11c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	\$3.40

	Per Cent Off List
Machine bolts, square head and nut:	
All diameters. Prices on application	
Carriage bolts, cut thread:	
All diameters. Prices on application	

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.
†125 lb. and more.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24)*	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	4.94c.
Boiler rivets	5.04c.

	Per Cent Off List
Tank rivets, 7/16 in. and smaller, 56	
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.80c.
*Structural shapes	3.80c.
*Soft steel bars, small shapes, iron bars (except bands)	3.90c.
†Reinforc. steel bars, sq. twisted and deformed	3.21c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.25c.
*Steel bands, No. 12 and 3/16 in. incl.	4.00c.
Spring steel	5.40c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	3.90c.
Diam. pat. floor plates, ¼ in.	5.45c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.
‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.86c.

Soft steel bars	3.75c.
†Reinforc. steel bars	2.60c.
†Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'd wire, per 100 lb.	\$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95
Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count	
½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

†Outside delivery 10c. less.
*For 5000 lb. or less.
†Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.95c.
Floor plates	5.85c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	\$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c'd nails, base 100-lb keg	3.50
Chain, lin. per 100 lb.	8.35

	Net per 100 Ft
Seamless steel boiler tubes,	
2-in.	\$20.37
4-in.	48.14
Lap-welded steel boiler tubes,	
2-in.	19.87
4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.92c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg	\$3.26
Black wire, base per 100 lb. (2500-lb. lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON

	Base per Lb.
Channels, angles	4.20c.
Tees and zeos, under 3"	4.45c.
H beams and shapes	4.07c.
Plates—Sheared, tank, and univ. mill. ¼ in. thick and heavier	4.08c.
Floor plates, diamond pattern	6.03c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.94c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)....	3.94c.
Galvanized sheets (No. 24)*....	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.
Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot- rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.	

* Under 400 lb., .50c. over base;
400 to 1499 lb., base; 1500 to 3499 lb.,
base less .10c.; 3500 lb. and over, base
less .15c.

Prices delivered by truck in metro-
politan Detroit, subject to quantity
differentials covering shipment at
one time.

Galvanized and hot-rolled annealed
may not be combined to obtain quan-
tity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes..	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles....	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)....	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)....	4.31c.
Boiler rivets, cone head (keg lots)	4.31c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots)	5.81c.
Black annealed wire (No. 6 to No. 9 incl.	3.90c.
Com. wire nails and cement coated nails	
1 to 14 kegs	3.00c.
15 kegs or more	2.90c.

	Per Cent Off List
Machine bolts and carriage bolts, 1/2x6 and smaller65-10
Larger65
Coach and lag screws65
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)....	.65

Prices given above are delivered
Milwaukee.

On plates, shapes, bars, hot-rolled
strip and heavy hot-rolled sheets,
the base applies on orders of 400 to
3999 lb. On galvanized and No. 24
hot-rolled annealed sheets the prices
given apply on orders of 400 to 1500
lb. On cold-finished bars the prices
are for orders of 1000 lb. or more of
a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	3.60c.
Structural shapes	3.70c.
Plates	3.70c.
Cold-finished bars	4.20c.
Hot-rolled annealed sheets, No. 24	4.50c.
Galvanized sheets, No. 24.....	5.10c.

On mild steel bars, shapes and
plates the base applies on 400 to 14,-
999 lb. On hot-rolled sheets, gal-
vanized sheets and cold-rolled sheets
base applies on 15,000 lb. and over.
Base on cold-finished bars is 1000
lb. and over of a size.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	3.85c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons. 3.11c.	
Plates	3.90c.
Hot-rolled sheets, No. 10	3.80c.
Bands	3.85c.
Hoops	4.10c.
Special threading steel	3.95c.
Checkered floor plates 1/4 in. and heavier	5.90c.
Galvanized bars, bands and small shapes	6.35c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	\$4.50

On plates, shapes, bars, hot-rolled
strip and heavy hot-rolled sheets the
base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers'
plants.

For second zone add 10c. per 100 lb.
for trucking.

CHATTANOOGA

	Base per Lb.
Mild steel bars	3.96c.
Iron bars	3.96c.
Reinforcing bars	3.96c.
Structural shapes	4.01c.
Plates	4.01c.
Hot-rolled sheets No. 10.....	3.91c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*.....	4.76c.
Steel bands	4.16c.
Cold-finished bars	4.86c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10.....	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24....	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	4.35c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	60

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.14c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10.....	4.10c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	\$3.30
Bolts and nuts, per cent off list	.65

PACIFIC COAST

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars..	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports ..	2.975c.	2.975c.	3.625c.
Hot-rolled an- nealed sheets (No. 24)	5.15	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel			
Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons ..	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	\$3.65	\$3.60	\$3.70

All items subject to differentials
for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	\$48.00
High-heat duty, New Jersey....	58.00
High-heat duty, Ohio	43.00
Intermediate, Pennsylvania Maryland, Kentucky, Miss- souri and Illinois	43.00
Intermediate, New Jersey	46.00
No. 1, Ohio	40.00
Ground fire clay, per ton	7.00
5 per cent trade discount on fire clay brick.	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$48.00
Chicago District	57.00
Birmingham	48.00
Silica cement per net ton.....	8.50
5 per cent trade discount on silica brick.	

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plym- outh Meeting and Chester....	\$47.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	\$67.00
Chemically bonded, f.o.b. Balti- more	57.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	42.00
Domestic, f.o.b. Chewelah, Wash.	24.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	21.00
Delivered San Francisco, Los Angeles or Seattle	25.00
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	\$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.50
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$28.50
---	---------

Gray Forge

Valley or Pittsburgh furnace	\$20.50
------------------------------	---------

Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	\$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.50

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Per Gross Ton	
Domestic, 80% (carload)	\$95.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$30.00
F.o.b. New Orleans	30.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 6.00 to 6.50%	\$28.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace	
Per Gross Ton	
10.00 to 10.50%	\$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	\$1.35
Ferrotungsten, lots of 5000 lb.	1.40
Ferrotungsten, smaller lots	1.45
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.50c.
Ferrochromium, 2% carbon	16.50 to 17.00c.
Ferrochromium, 1% carbon	17.50 to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V.	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50
Ferrocobalt, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobalt, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered.	
3%	95.00
2.50% carbon grade	100.00
2% carbon grade	105.00
1% carbon grade	115.00

Note: Spot prices are \$5 a ton higher except on 75 per cent ferrosilicon on which premium is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports	
Per Gross Ton	
Old range, Bessemer, 51.50%	\$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10

Mesabi, non-Bessemer, 51.50%	\$4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% dry, Algeria	13.50c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	10.00c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	34c.
Man., African, Indian, 44-48%	25c. to 30c.
Man., African, Indian, 49-51%	30c.
Man., Brazilian, 46 to 48½%	Nominal. 25c. to 30c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	\$18.00 to \$18.50
Tungsten, domestic, scheelite delivered, nominal	\$18.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per net ton:	
South African	\$16.00
Rhodesian, 45%	23.00
Rhodesian, 48%	25.00
Turkish, 48-49%	24.50 to \$25.00
Turkish, 45-46%	20.50 to 21.00
Turkish, 44%	19.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
52%	\$25.50 to \$26.00
50%	24.50
48-49%	24.50 to 25.00

FLUORSPAR Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$19.00
Domestic, barge and rail	20.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	\$20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial	4.25c.
Del'd Ch'go, No. 5 industrial	3.90c.
Del'd Cleve'd, No. 3 distillate	6.00c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

COKE AND COAL

Coke Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	\$4.25 to \$4.35
Foundry, f.o.b. Connellsville, Prompt	4.50 to 5.80
Foundry, by - product, Chicago ovens	9.00
Foundry, by - product, del'd New England	12.00
Foundry, by - product, del'd Newark or Jersey City	9.60 to 10.05
Foundry, by - product, Philadelphia	9.85
Foundry, by - product, delivered Cleveland	10.25
Foundry, by - product, delivered Cincinnati	9.75
Foundry, Birmingham	6.50
Foundry, by - product, St. Louis, f.o.b. ovens	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

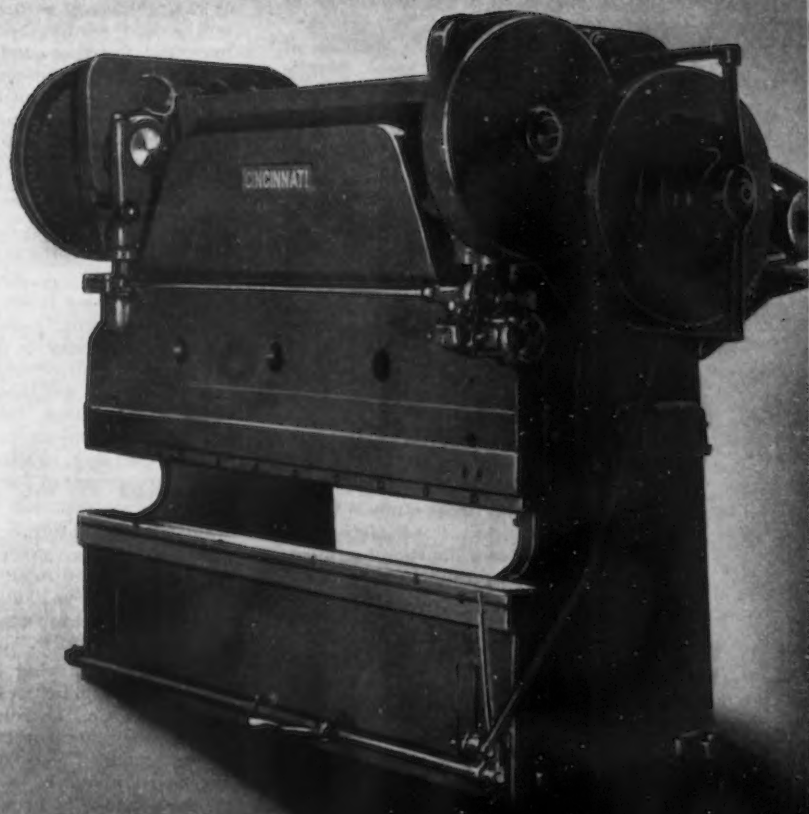
Coal Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¼-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

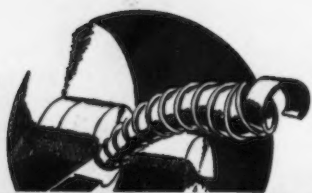


Multiple punching a tank stave
where holes must line up. The
accuracy demanded on this job is
typical of the performance of
Cincinnati Press Brakes • • •

THE CINCINNATI SHAPER COMPANY
CINCINNATI, OHIO



SHAPERS • SHEARS • BRAKES



THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

... *Chrysler places orders for machine tools despite closing of its offices by strike.*

o o o

... *Business generally is holding up well, although hesitancy appears in some quarters.*

o o o

... *Some price advances announced and others may follow upward trend of materials.*

Detroit

MARCH will go down as probably the most active inquiry month of the year, and April promises to be the best month so far as machine tool orders are concerned. Chrysler is still pursuing its plans to manufacture in Canada all of the motor blocks and component parts for Dodge and Plymouth cars assembled in Canada, but the decision as to what percentage of parts has yet to be made. Surprisingly enough, Chrysler placed a number of orders for machinery last week, despite the fact that all of its offices were held by strikers. Orders for a new line of presses in the DeSoto plant went to Clearing Press of Chicago, and the Chrysler-Jefferson division closed on a number of units duplicating cylinder block line equipment installed last year. General Motors is still figuring on changes on the 16-cylinder Cadillac engine and is getting quotations on equipment for a truck diesel to be made at the Cadillac plant. Most active General Motors plant of the week, from the point of view of inquiries, has been Pontiac, which is figuring on increasing its motor output by approximately 30 per cent. It is understood that plans for doubling the production capacity of the Buick 40 engine line have been held up indefinitely. There is a possibility that Ford Motor Co. may expand its own die shop facilities, but jobbing tool and die shops are decidedly out of the market at the present time.

Cincinnati

WHILE machinery demand is unchanged in averages, type trends varied a bit the past week from those of the preceding period. Lathes, heretofore in close position to millers and

grinders, lagged a trifle, while millers and grinders forged ahead. Heavy tools are in steadily good demand, and this contributes a steadiness to the market which was lacking. Business is widely scattered, with substantial ordering reported from foreign as well as domestic sources. Labor difficulties in the automotive field have had no effect on the machinery market here.

The problem of pattern rehabilitation is the last remnant of flood troubles here, but the trade indicates that this is being rapidly overcome. Production is at about 80 per cent of capacity, but this is not sufficient to make deliveries as prompt as consumer need. Shipments are being extended in some instances to six months and longer.

Cleveland

BUSINESS with machine tool builders is holding up fairly well, but continues slack with dealers, as there is not much activity in this immediate territory. Deliveries of automatic screw machines are becoming more extended, a leading local maker not promising shipments until around the first of the year. Deliveries of turret lathes are promised for September and October.

Considerable hesitancy has appeared recently among prospective buyers. This is attributed to the labor troubles in the automotive industry. There is a heavy demand for good used machinery, and the supply is scarce.

Presses are moving in good volume to diversified industries. The Clayton & Lambert Co., Detroit, which is enlarging its plant for the manufacture of automobile body stampings, has purchased about 20 presses involving an expenditure of around \$200,000.

New York

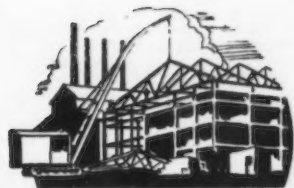
ALL sellers report good business in March so far, but orders and inquiries have shown a tendency to slacken slightly in the past week. The common belief is that widespread strikes extending into every type of business and industry have held up tool-buying programs to some extent. One large customer in this district is known to have cut down on his buying, although his budget provides for continuous purchasing. This company recently made a deal with labor for some plants, but it may be that fear of further difficulties and additional costs has made a curtailment of purchasing temporarily advisable. Some builders, whose prices were not advanced in December, are boosting their quotations 10 to 15 per cent now. So far as is known, no makers who made advances the first of the year have added to their selling prices again, although costs are rising steadily, and some companies are unable to make deliveries before September and October, or even later. The shortage of skilled labor is regarded as a boon by some, as they believe that situation may prevent production from attaining a dangerously high level.

Pittsburgh

INQUIRIES are more numerous than a week ago. Requests for data are general and cover the entire field of machine tools. Westinghouse Electric & Mfg. Co. has inquiries out for quite a large number of tools. Orders are stepping up, and it is expected that this trend will improve perceptibly during the remainder of the month. A considerable number of price advances averaging 10 to 15 per cent have been announced, with customers getting little time to cover. The increases were expected in view of higher material and labor costs. Necessity of securing appropriations before placing orders will make it impossible for some buyers to take advantage of old prices. Quotations not already advanced will undoubtedly be marked up in the near future. Meanwhile, deliveries are becoming further extended. Sixty days is an excellent promise with 90 days the average, and some machine tools are not obtainable within six months to a year.

Unemployed Workers Greater in January

The total number of unemployed workers in January was 8,403,000, according to estimates of the National Industrial Conference Board. This was an increase of 582,000 unemployed workers, or 7.4 per cent, over the December unemployment, and a decrease of 1,933,000, or 18.7 per cent, from the total for January, 1936.



PLANT EXPANSION AND EQUIPMENT BUYING

... **Crown Cork & Seal Co., Baltimore, has awarded contract for can manufacturing plant at St. Louis, to cost over \$2,000,000 with equipment.**

o o o

... **Bridgeport Brass Co., Bridgeport, Conn., plans an expenditure of \$2,000,000 for additions and equipment.**

◀ NORTH ATLANTIC ▶

National Can Co., 110 East Forty-second Street, New York, will begin superstructure in April for four-story addition to plant at 811 South Wolfe Street, Baltimore, 50 x 185 ft. Cost close to \$150,000 with equipment. **Brown & Matthews, Inc.,** 122 East Forty-second Street, New York, is engineer and in charge of erection.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 30 for three electric-driven, low platform lifting trucks, complete with batteries (Schedule 281), for 85,350 lb. of copper nickel alloy condenser tubes (Schedule 246) for Brooklyn Navy Yard; five steam-heated water sterilizers and five combination sterilizers (Schedule 230).

Sullivan County Plumbing & Heating Supply Co., Liberty, N. Y., has asked bids on general contract for two-story and basement addition, 50 x 110 ft., for storage and distribution, with pipe shop and other mechanical facilities. Cost over \$50,000 with equipment.

Shepard J. Goldberg, Inc., 601 West Twenty-sixth Street, New York, wines and liquors, has leased building at 23-57 Borden Avenue, Long Island City, and will remodel for new mechanical-bottling plant, with storage and distributing departments.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until March 29 for cable and two reels (Circular 145); until April 2, 21,650 ft. of three-conductor cable, rubber insulated (Circular 141).

John Eichler Brewing Co., 3582 Third Avenue, New York, has plans for multi-story addition for storage and distribution. Cost over \$60,000 with equipment. **Harley & Ellington, Inc.,** Stroh Building, Detroit, is architect and engineer.

Texas Corp., 135 East Forty-second Street, New York, oil products, is arranging fund of \$21,560,000 for expansion and improvements in plants and properties of subsidiary interests, including Texas Co. Work will comprise extensions in oil and gasoline refineries, oil and natural gas producing properties, pipe lines, storage and distributing facilities, also new development work in producing areas. Financing is being arranged through sale of capital stock, with gross valuation of about \$62,000,000.

United States Engineer Office, First District, New York, asks bids until March 29 for one double-acting, double-duty pile hammer for Binghamton, N. Y. (Circular 211).

New York Central Railroad Co., 466 Lexington Avenue, New York, C. C. Warne, purchasing agent, asks bids until March 30 for steel wheels, axles, tubing, wire nails, track bonds, insulated magnet wire, roller bearings and other equipment (Serial Contract No. 3, 1937).

Carrier Corp., 850 Frelinghuysen Avenue, Newark, N. J., manufacturer of air-conditioning equipment and systems, is con-

sidering branch plant near Albany, N. Y., where negotiations are under way for purchase of property. Plant will consist of several one-story units, reported to cost over \$100,000 with equipment.

State Purchase Commissioner, State House, Trenton, N. J., asks bids until March 29 for following equipment for State motor vehicle inspection department: 45 brake testers, 45 wheel alignment indicators, 45 hydraulically operated lifts, 45 headlight testers and 28 automatically operated accumulator rams.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 30 for one motor-driven vertical hydraulic triplex pump (Schedule 207), one motor-driven engine lathe (Schedule 231) for Philadelphia Navy Yard.

◀ BUFFALO DISTRICT ▶

Oneida Community, Ltd., Sherrill, N. Y., manufacturer of plated wares, animal traps and kindred products, has let general contract to M. C. Morgan, Kenwood, N. Y., for one-story addition, 100 x 120 ft. Cost over \$50,000 with equipment. E. D. Pitt, Kenwood, is architect.

Niagara, Lockport & Ontario Power Co., Electric Building, Buffalo, will take bids soon on general contract for one-story and basement equipment, service and garage building, 85 x 125 ft., at Fredonia, N. Y., for company motor trucks and cars. Cost about \$45,000 with equipment.

Link Aviation Devices, Inc., Endicott, N. Y., manufacturer of aircraft equipment, has leased one-story and basement building, 75 x 240 ft., to be erected by Tri-Cities Airport Commission, Endicott, at municipal airport, for new plant. Cost over \$75,000 with equipment. Conrad & Cummings, Security Mutual Building, Binghamton, N. Y., are architects.

◀ NEW ENGLAND ▶

Arrow-Hart & Hegeman Electric Co., Hartford, Conn., manufacturer of electric switches, conduits and other electrical equipment, has asked bids on general contract for two-story addition to South works, 64 x 130 ft. Cost over \$75,000 with equipment. Mylchreest & Reynolds, 238 Palm Street, are architects and engineers.

Central Vermont Railroad Co., St. Albans, Vt., plans new engine house and shop on Fourth Street, New London, Conn., and will take bids soon on general contract. Cost close to \$50,000 with equipment.

Commanding Officer, Ordnance Department, Watertown Arsenal, Watertown, Mass., asks bids until March 29 for one hydraulic straightening press (Circular 380).

Eastern Tool & Stamping Co., Ballard Street, Saugus, Mass., plans early rebuilding of part of plant recently destroyed by fire. Loss close to \$30,000 with equipment.

Bridgeport Brass Co., East Main Street, Bridgeport, Conn., manufacturer of brass, bronze, copper and other metal rods, wire, tubing, etc., has plans for additions including one-story rolling mill with rated capacity of 6,000,000 lb. per month, and several adjoining one-story units. Cost over \$2,000,000 with machinery. Company has authorized financing through sale of capital stock. Stone & Webster Engineering Corp., Boston, is consulting engineer.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until April 9 for five hand milling machines and attachments (Circular 174); until April 12, one comparator and measuring projector (Circular 176).

J. S. White Co., 22 Dexter Street, Pawtucket, R. I., contemplates erection of a foundry at Central Falls, R. I., to cost about \$75,000.

◀ SOUTH ATLANTIC ▶

Coca-Cola Co., North Avenue, Atlanta, Ga., has acquired property at Dallas, Tex., for new branch plant, consisting of main one, two and three-story and basement unit, 300 x 800 ft., for beverage making, mechanical-bottling, storage and distribution, with several smaller buildings for miscellaneous service, including boiler house. Cost about \$800,000 with equipment. General contract has been let to Stuart Construction Co., 516 Fifth Avenue, New York. New plant will duplicate a unit to be built at Kearny, N. J., for which erection contract recently was let to same company. Robert & Co., Bona Allen Building, Atlanta, are architects and engineers.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for four steel radio range beacon towers for naval air station, Pensacola, Fla. (Specifications 8432).

Brooks Foundry & Machine Co., 521 Marietta Street, N.W., Atlanta, Ga., manufacturer of grey iron castings, etc., has let general contract to Hardin & Ramsey, 161 Spring Street, N.W., for two-story addition, 50 x 60 ft. Cost about \$40,000 with equipment.

◀ WASHINGTON DIST. ▶

Reid-Avery Co., 6 Dunmanway, Baltimore, manufacturer of welding rods, wire products and kindred specialties, has asked bids on general contract for one-story addition, 100 x 120 ft. Cost about \$60,000 with equipment. Carson & Carson, Commercial Trust Building, Philadelphia, are architects and engineers. Main offices of company are in Broad Street Station building, Philadelphia.

Constructing Quartermaster, Munitions Building, Washington, asks bids until March 31 for manhole covers and frames, and cast iron gratings (Proposal 6141-21).

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until April 8 for one steam pump and accessories for boiler feed service (Proposal 395-102).

Rustless Iron & Steel Corp., 1001 Edison Highway, Baltimore, has asked bids on general contract for one-story additions, including melting shop to cost about \$175,000 with equipment; bar mill, cost approximately \$230,000 with machinery; cold drawing and finishing mill, \$60,000; storage and distributing buildings, \$50,000, and power substation and distributing lines, \$110,000 with equipment. H. A. Brassert & Co., 310 South Michigan Avenue, Chicago, are consulting engineers.

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until April 1 for two air-operated presses (Circular 137); until April 8, one exhaust fan (Circular 143); until April 12, one distillation unit for recovery of acetic acid (Circular 136).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 30 for one 36-in. motor driven single surfacer (Schedule 186), 18,000 ft. of electric cable (Schedule 193), one motor-driven bench-type sensitive drill (Schedule 170), one motor-driven woodworking band saw (Schedule 168), 13 machine hardness testers (Schedule 200), one motor-driven wood shaper and equipment (Schedule 208), one motor-driven band metal saw (Schedule 189), motor-driven fresh water pumps (Schedule 211), one motor-driven wood shaper (Schedule 208) for Eastern and Western Navy yards; one molding machine (Schedule 247), five motor-driven turret lathes and five ammeters (Schedule 248) for Norfolk, Va., yard; 322 motor-driven

gasoline portable pumps (Schedule 209) for Norfolk and Mare Island yards.

Army Quartermaster, Corozal, Panama Canal Zone, plans rebuilding equipment storage and distributing building destroyed by fire March 14. Loss about \$100,000.

◀ SOUTH CENTRAL ▶

Continental Gin Co., 212 Poplar Street, Memphis, Tenn., manufacturer of cotton-ginning machinery and parts, has asked bids on general contract for two-story addition, 90 x 148 ft., with portion reserved for storage and distribution. Cost close to \$75,000 with equipment. E. L. Harrison, Fidelity Bank Building, is architect.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until April 1 for filter plant equipment, Hiwassee Dam project.

Swift & Co., Union Stock Yards, Chicago, have plans for new branch plant on Old Spanish Trail, near Lake Charles, La., where site recently was acquired. Work is scheduled to begin early in May. Cost over \$75,000 with equipment. E. Shutt & Sons, Lake Charles, are engineers.

La Fourche Sugars Corp., Thibodaux, La., O. J. Mire, president, recently organized, has acquired former plant of Leighton Sugar Mill near Thibodaux, and will remodel for new cane sugar mill. Cost over \$75,000 with machinery. Harvey Peltier is secretary and treasurer.

United States Engineer Office, Vicksburg, Miss., asks bids until March 29 for boiler tubes, 4-in. outside diameter, 11 ft. 7½ in. long (Circular 191).

Oertel Co., 1400 Story Street, Louisville, brewer, has leased one-story building to be erected at Fifth and York Streets, Newport, Ky., by L. Reidinger, 418 York Street, Newport, for new branch for storage and distribution. Cost over \$45,000 with equipment.

◀ SOUTHWEST ▶

Crown Cork & Seal Co., Eastern Avenue and Kresson Street, Baltimore, has awarded general contract to Consolidated Engineering Co., 20 East Franklin Street, for new plant on Natural Bridge Avenue, St. Louis, where six-acre tract has been acquired. New plant will be used for production of metal cans and containers, and will be operated by Crown Can Co., a subsidiary, first noted address. It will comprise main one and two-story unit, 225 x 500 ft., and several smaller buildings, including laboratory. Cost over \$2,500,000 with equipment. Lucius R. White, Jr., 10 West Chase Street, Baltimore, is architect.

Springfield Wagon & Trailer Co., Springfield, Mo., Leland P. Gott, R.D. 2, head, has approved plans for one-story plant, 42 x 150 ft., for manufacture of motor trailers, parts and kindred equipment. Cost over \$45,000 with machinery.

American Soda Water Co., 1328 Ann Avenue, St. Louis, has asked bids on general contract for one and two-story mechanical-bottling department, 50 x 115 ft. Cost close to \$50,000 with equipment.

Central Can Co., Brooklyn Avenue and Twenty-ninth Street, Kansas City, Mo., manufacturer of galvanized and other tin cans and containers, has leased five-story and basement building at 1004-6 Santa Fe Street, and will remodel for new production unit.

Federal Mining & Smelting Co., Picher, Okla., plans rebuilding ore milling plant recently destroyed by fire. Loss about \$50,000 with machinery. Company is a subsidiary of American Smelting & Refining Co., New York.

Carraway-Byrd Corp., Dallas, Tex., Thomas W. Carraway, president, recently organized to manufacture air-conditioning equipment and systems, has leased seven-story building at Houston and Elm Streets and will remodel for plant. Cost over \$200,000 with machinery.

United States Engineer Office, Federal Building, Galveston, Tex., asks bids until March 29 for malleable iron pipe fittings, track spikes, air compressor parts and other equipment (Circular 201).

◀ OHIO AND INDIANA ▶

Perry-Fay Mfg. Co., Perry Court, Elyria, Ohio, manufacturer of screw machine products, has asked bids on general contract for one-story addition, 50 x 200 ft. Cost over \$65,000 with equipment. Silsbee & Smith, Turner Building, are architects. R. D. Perry is general manager.

DeVilbiss Co., 300 Phillips Avenue, Toledo, Ohio, manufacturer of spraying equip-

ment and devices, parts, etc., will ask bids soon on general contract for one-story addition. Cost over \$100,000 with equipment. Austin Co., Cleveland, is engineer.

Rayon Machinery Corp., Cleveland, organized a few months ago as an interest of Industrial Rayon Corp., West Ninety-eighth Street and Walford Avenue, has leased 35,000 sq. ft. in building at 7275 Wentworth Avenue, S.W., for new plant. Initial operations will be given over to production of equipment for new rayon mill of parent company at Painesville, Ohio, which will represent an investment over \$2,000,000.

Timms Spring Co., Taylor and Boston Streets, Elyria, Ohio, has let general contract to Henry Heidrich, Elyria Block, for one-story addition, 60 x 200 ft. Cost over \$75,000 with equipment. Silsbee & Smith, Turner Building, are architects.

Tappan Stove Co., Mansfield, Ohio, plans expansion and improvements, including installation of equipment. Company has arranged for sale of capital stock to total about \$598,000, a considerable part of proceeds to be used for purpose noted.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until April 5 for gun mount assemblies and gun mount adapter assemblies (Circular 612); until April 6, drift meter assemblies (Circular 581); until April 9, one automatic engineer equipment, for automatically controlling engine speed and manifold pressure of engines of four engine-unit airplane (Circular 614).

Baroda Gray Iron Foundry, Inc., Bremen, Ind., has negotiated with Bremen Industrial Corp., Bremen, for erection of one-story foundry to be occupied under long-term lease. Cost over \$40,000 with equipment.

Hoyt Machine Co., 1925 Massachusetts Avenue, Indianapolis, manufacturer of screw machine products, has leased part of former plant of South Bend Watch Co., South Bend, Ind., and will remodel for new plant. Company will operate as Charles D. Hoyt Co., specializing in same line of production. Charles D. Hoyt is head of both organizations.

◀ WESTERN PA. DIST. ▶

Westinghouse Electric & Mfg. Co., East Pittsburgh, has plans for one-story addition to branch plant at Trafford City, Pa., 50 x 400 ft. Cost over \$200,000 with equipment. J. B. George is company engineer in charge. Company is also carrying out expansion at branch plant at Lima, Ohio, to double production of small motors and parts.

American Steel Foundries, Thirty-sixth Street, Pittsburgh, has let general contract to E. H. Dobson, 145 Westland Drive, for two and three-story addition to plant at Verona, Pa., 60 x 100 ft., with office structure, 25 x 60 ft. Cost over \$75,000 with equipment. Main offices of company are at Chicago.

Owens-Illinois Glass Co., Ohio Building, Toledo, Ohio, has let structural steel contract to Pfehlehem Steel Co. for addition to branch plant at Huntington, W. Va. Cost over \$100,000 with equipment.

◀ MICHIGAN DISTRICT ▶

Firth-Sterling Steel Co., 2800 East Grand Boulevard, Detroit, has let general contract to Austin Co. Curtis Building, for one-story building on West Chicago Boulevard for storage and distribution. Cost close to \$50,000 with equipment. Main offices of company are at McKeesport, Pa.

Buhl Stamping Co., 2730 Scotten Avenue, Detroit, manufacturer of stamped metal products, has plans for second-story addition to present one-story plant unit. Cost over \$50,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Arrow Distilleries, Inc., 3539 Concord Avenue, Detroit, has plans for one-story addition. Cost about \$45,000 with equipment. Robert Finn, 2305 Park Avenue, is architect.

Packard Motor Car Co., 1580 East Grand Boulevard, Detroit, has awarded general contracts for two one-story additions, including new unit, to O. W. Burke Co., Fisher Building, and Barton-Marlow Co., 1900 East Jefferson Street, respectively. Cost over \$100,000 with equipment. Plans are under way for a third one-story addition. Albert Kahn, Inc., New Center Building, is architect and engineer.

◀ MIDDLE WEST ▶

Southside Brewing Co., 3700 South Halsted Street, Chicago, has let general contract to Kuh-Winnegge Construction Co.,

6232 South Hermitage Avenue, for one-story mechanical-bottling works, 72 x 165 ft. Cost over \$65,000 with machinery. Joseph Bednarik, 1643 West Garfield Boulevard, is architect.

Quartermaster, Scott Field, Ill., asks bids until April 5 for one 30-ft. portable belt conveyor (Proposal 824-45).

Public Service Co. of Northern Illinois, 72 West Adams Street, Chicago, has plans under advisement for expansion and improvements in steam-electric generating plant at Joliet, Ill., including new turbo-generator unit, high-pressure boilers and auxiliary equipment. Cost over \$2,000,000.

Fontenelle Brewing Co., 210 Hickory Street, Omaha, Neb., has let general contract to Vrana Construction Co., 1956 South Fifteenth Street, for extensions and improvements in five-story building adjoining main plant, for a stock house and general production. Cost over \$50,000 with equipment. H. A. Raapke, Brandeis Theater Building, is architect.

Bureau of Reclamation, Custom House, Denver, asks bids until March 31 for one 15,000-gal. steel storage water tank, complete with float gage, steel ladder, manhole, overflow pipe, outlet connections, field bolts, etc. (Proposal 32005-A).

City County, Waltham, N. D., will close bids early in April for municipal electric power plant and equipment. Cost about \$40,000. E. L. Lium, 913 Almonte Street, Grand Forks, N. D., is consulting engineer.

Board of Education, St. Cloud, Minn., plans installation of manual training and shop equipment in two-story addition to technical high school. Cost about \$125,000. Bond issue is being arranged. Louis C. Pinault, Lahr Building, is architect.

Keeley Brewing Co., 516 East Twenty-eighth Street, Chicago, has let general contract to John Gebhardt & Son, 308 West Washington Street, for two-story mechanical-bottling division, 46 x 127 ft. Cost over \$65,000 with equipment. George Lehle, 111 West Washington Street, is engineer.

Milwaukee Valve Co., 2375 South Burrell Street, Milwaukee, is considering bids opened March 13 for new foundry building, 70 x 160 ft., two stories, designed by Lawrence E. Peterson, consulting engineer, 312 East Wisconsin Avenue. Cost, with equipment, about \$75,000.

Board of Education, Racine, Wis., has engaged Frank J. Hoffman, local architect, to make plans for proposed third unit of vocational school, to cost about \$150,000 equipped. Thomas S. Rees is principal.

Northeastern Boiler & Welding Co., 323 South Pearl Street, Green Bay, Wis., has plans by C. H. Williams, architect, 212 Pine Street, for new factory building. Cost estimates have not been disclosed.

◀ PACIFIC COAST ▶

Schlage Lock Co., 20 Blanken Street, San Francisco, manufacturer of locks and locking devices, has let general contract to Cahill Brothers, 206 Sansome Street, for one-story addition. Cost close to \$40,000 with equipment. W. Adrian, 417 Market Street, is engineer.

Bureau of Reclamation, Custom House, Denver, asks bids until March 31 for liquid petroleum gas storage and gasifying equipment, pipe and fittings for piping gas, gas meters, etc., for Government camp at Friant Dam, Central Valley project (Specifications 894-D); until April 1, two high-pressure gate assemblies, 2-ft. 9-in. square, for outlet works of Unity Dam, Burnt River project, Ore. (Specifications 900-D).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 30 for one hydraulic pump and one hydraulic accumulator (Schedule 198), two exhaust gas-heated evaporators, one distilling equipment and spare parts (Schedule 145); until April 2, two single drum deck winches and spare parts (Schedule 223); until April 6, one motor-driven engine lathe (Schedule 250) for Mare Island Navy Yard; until March 30, one motor-driven multiple-spindle drill (Schedule 192), one motor-driven radial drill (Schedule 221) for Puget Sound yard; one motor-driven planer, complete with motor-generator set (Schedule 216) for Keyport, Wash., yard.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has approved plans for extensions and improvements in generating plant, Station C, at Oakland, Cal., to include electric generator units and accessories, high-pressure boilers and complete auxiliary equipment. Cost about \$5,000,000. Transmission lines will be extended later.

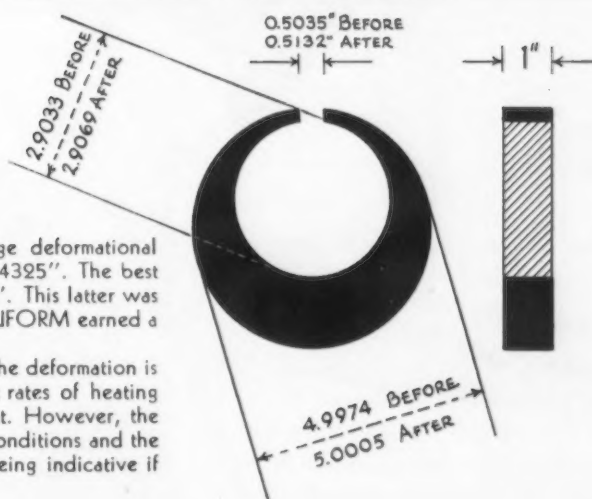
Soundview Pulp Co., Bayside, Everett, Wash., manufacturer of processed sulphite (CONTINUED ON PAGE 114)

TRUFORM

DEFORMATION TEST:—

On a series of tests the average deformational variation of TRUFORM was .004325". The best of the other steels was .00456". This latter was designated as 100% and thus TRUFORM earned a rating of 106%!

(It should be mentioned that the deformation is very sensitive to changes in the rates of heating and cooling in this type of test. However, the tests were run under optimum conditions and the results may be considered as being indicative if not positive.)



TRUFORM OIL HARDENING
NON-SHRINKABLE ALLOY STEEL
HAS BEEN DEVELOPED FOR THE
MANUFACTURE OF TOOLS
THAT MUST COMBINE EXTREME
ACCURACY AND KEEN CUTTING
EDGE.

The Jessop Steel Company offers complete service in Carbon, Alloy or High Speed Tool Steels, also in Stainless and Heat Resisting Steels. We can furnish Composite types of Stainless and Tool Steel grades.

"ALL PRODUCTS MADE IN AMERICA"

JESSOP STEEL CO.

GENERAL OFFICE AND WORKS
WASHINGTON, PENNA.

Branches or Agents In All Principal Cities

Please send further information on TRUFORM.

NAME _____
COMPANY _____
ADDRESS _____

LAMSON & SESSIONS *offer an unusual*



service on

SPECIAL

fastenings

JUST look at the parts scattered around on these two pages facing you. All were produced by LAMSON & SESSIONS on bolt-making equipment. In each instance a problem in engineering, design, production, assembly or cost was encountered—and solved.

Not long ago many parts shown here were thought impossible to produce by heading or upsetting. But here they are, made to close tolerances and with an entirely satisfactory finish. LAMSON & SESSIONS are particularly well equipped for their manufacture in *production* quantities.

What is gained by producing these parts on bolt-making equipment? Several advantages. As for example, every one of these products has improved physical properties, better structure, greater strength and was made at a lower cost than by any other known method.

Not only does LAMSON & SESSIONS manufacture parts special in design but the fabrication of special alloys is an every day occurrence. Among the materials used by LAMSON & SESSIONS in the manufacture of our products are

- *All of the various grades of Stainless Steels, Heat and Corrosion resisting alloys*
- *Various Brasses and Bronzes such as Everdur, Duronze, Herculoy, Olympic Bronze and others sold under other trade-names*
- *Aluminum Alloys*
- *Common Carbon and Low Alloy Steels*
- *Monel Metal and Invar*
- *Special Steels developed for special purposes and sold under their own trade-names*

LAMSON & SESSIONS' staff of engineers and metallurgists familiar with fabrication and heat treatment of special alloys devote much of their time to co-operation with customers' engineers and production departments—a service that results in improving a product or reducing its cost. If the part can be produced on bolt-making equipment, these men can tell you how in short-order. It will pay you to investigate the possibilities this highly specialized service holds for you. An inquiry does not obligate you in the least.

THE LAMSON & SESSIONS CO.

General Offices, Cleveland, Ohio • Plants at Cleveland and Kent, Ohio; Chicago and Birmingham

BOLTS • NUTS • COTTERS • CAP SCREWS



(CONTINUED FROM PAGE 110)

pulp, has let general contract to Austin Co., Seattle, for several one and multi-story buildings forming a third plant unit. Cost about \$1,300,000 with equipment.

Oakland Sheet Metal Supply Co., Thirtieth and West Streets, Oakland, Cal., has let general contract to John J. Moore Co., 354 Hobart Street, for one-story building at 2100 Poplar Street for storage and distribution. Cost about \$40,000 with equipment. Milo S. Farwell, Twentieth and Illinois Streets, San Francisco, is architect.

FOREIGN

Japanese Antimony Mining Co., Ltd. (Nippon Antimony Kogyo K.K.), Tokyo, Japan, has plans for new antimony refinery at Amagasaki, Province of Hyogo, where property has been acquired. It will consist of several one and multi-story units and cost over \$500,000 with machinery.

Firestone Tire & Rubber Co., Ltd., London, England, has plans for additions to mill on Great West Road, Brentford, England, comprising several one-story units. Cost close to \$600,000 with machinery.

English Steel Corp., Ltd., London, England, plans new buildings and installation of equipment for plant at Sheffield, England, for large increase in present capacity. Cost over \$500,000 with machinery.

Rubblesdale Cement Co., Ltd., Clitheroe, England, plans new buildings and installation of equipment for large increase in present output. Cost over \$600,000 with machinery.

Dai-Nippon Sugar Mfg. Co., Ltd., Marunouchi, near Tokyo, Japan, is organizing a new subsidiary to construct a plant for production of line of chemical products, including ammonium sulphate, superphosphate and kindred specialties. Plant will comprise several one and multi-story units near sugar mill, where site has been secured. Cost over \$750,000 with equipment.

Rust Proofing and Metal Cleaning Compounds

A COMBINATION of a phosphoric acid base rust proofing agent, together with a grease solvent, is being marketed under the proprietary name "Metalprep" by the Neilsen Chemical Co., 6564 Benson St., Detroit. The cleaner will remove oil, grease, waxes, rolling compounds and other foreign matter from metal surfaces so as to leave them chemically clean and ready for paint. It will also remove rust, besides inhibiting the agents that cause rust to form. The penetrative properties of the solvent are said to allow the mixture to enter pit holes, thus stopping further rust development. Like any phosphoric acid base compound, Metalprep etches the surface of the metal, producing microscopic tooth forms and assuring a firm bond between the metal and the prime or surface coat.

Metalprep lends itself readily to various forms of application. It may be brushed on and wiped off with rags or washed off with hot water, or it may be sprayed on with a gun. Small parts may be dipped in either hot or cold liquid. Special grades of Metalprep are available for these various types of application.

England Buying Machine Tools Chiefly From United States

BRITISH Government contracts with suppliers of imported equipment show that American machine tool builders are enjoying the bulk of the machine tool trade, according to the Machinery Division, Bureau of Foreign and Domestic Commerce.

A report from American Trade Commissioner Edward B. Lawson, London, contains an analysis of British orders which demonstrates a preference for American equipment in all classes of machine tools, it was stated.

Participation of American machine tool builders in this trade was 41 per cent of the total imports in the first nine months of 1932, 46 per cent in 1933, 53 per cent in 1934 and 1935, and 58 per cent in 1936, according to the Machinery Division. Germany, while also gaining in dollar volume during the last three years, lost in percentage share in 1936.

The marked increase in government expenditure in connection with the rearmament program during the calendar year 1936 is revealed in a partial analysis of machine tool contracts placed with manufacturers, distributors and importers in the United Kingdom by the War Office, the Admiralty and the Air Ministry, the Trade Commissioner reported.

There is no available public information in respect to the total number of machines involved in contracts for the supply of machine tools let by those government organizations, it was stated, but there is no doubt but that both the number of contracts and the number of units purchased have increased markedly. Contracts for the supply of five important classes of machine tools, namely, lathes, milling machines, grinding machines, gages and drilling machines, placed by the government services, are estimated to have approximated 275 to 300 during the year, according to the Trade Commissioner.

Lathes Most in Demand

Lathes were by far the most-sought machine tools as a class, and some 124 contracts were let to a considerable number of firms. The demand by the government and by industry for several popular types of lathes was so strong and the need for early delivery so urgent that domestic manufacturers which heretofore supplied practically the entire needs of the government were unable to accept all contracts and importers and distributors of for-

eign-made equipment were approached, the report states.

A similar situation prevailed in connection with many other important classes of machine tools. Next to lathes, milling machine contracts were the most numerous, some 55 having been placed during the 12 months under review. Gages and grinding machines, with some 38 contracts each, and drilling machines, with 23 contracts, were important factors in the machine tool trade with the government.

A wide range of tools was covered in the direct purchases made by the three services, but the five classes of equipment listed are believed to have been purchased in larger quantities than others. The sale of machine tools to industrial organizations engaged in the production of aero engines, munitions, vehicles, armament and other material under contract with the government greatly exceeded that made direct to the government under contract, but the above figures reveal something of the activity in that special branch of the trade, it was stated.

It is also notable that in the import trade in machine tools, which improved phenomenally in 1936, the United States is the leading supplier to the United Kingdom. As a supplier of lathes it easily led the field, accounting for about 60 per cent (by value) of the total imports. About 64½ per cent of the value of imports of milling machines, 71 per cent of grinding machines, 40 per cent of the drilling machines, and 70 per cent of planing and shaping machines were of American origin.

Japan Buys Pig Iron in U. S. and Canada

TOKIO, Japan (*Special Correspondence*).—The Japan Iron Co. is reported to have succeeded in contracting for the imports of 88,000 more tons of American and Canadian pig iron for deliveries during 1937. The present contracts involve 35,000 metric tons of Canadian pig, and 3500 metric tons of American pig for casting purposes and 50,000 metric tons of American pig for steel making. These will be the first imports of Canadian pig iron into Japan.

The company has already imported 100,000 metric tons of foreign pig, including 5000 tons of French pig and 95,000 tons of American pig, since the end of last year through the Mitsui and the Mitsubishi companies.

New Industrial Literature

A REVIEW OF CURRENT CATALOGS AND CIRCULARS . A TIME SAVING SERVICE FOR BUYERS

*Order by number literature wanted. No cost. No obligation
Address The Iron Age, 239 West 39th St., New York City*

WATTHOUR METER PROTECTORS.—Westinghouse Electric & Mfg. Co. Publication describing device for protection of meters from lightning surges. Illustrated with applications, and containing outline dimensions, wiring diagrams, and performance characteristics, the booklet describes the construction, application and connections for adequately protecting meters. Bulletin 3-156.

WATTHOUR DEMAND METERS.—Westinghouse Electric & Mfg. Co. 44-page catalog describing application and operation of types RW and RW-2 indicating demand registers and list prices in combination with various types of meters. Outline dimensions and wiring diagrams are included for each combination. Bulletin 3-157.

RIVETING OF ALUMINUM.—Aluminum Company of America. 35-page booklet describing the application of rivets to aluminum and listing shear strengths and design values and stresses. Full engineering data is provided as well as illustrations of riveting processes. Bulletin 3-158.

DIESEL POWER UNITS.—Fairbanks, Morse & Co. Descriptive booklet covering construction and applications of smallest diesel model in Fairbanks line, Model 36. Well illustrated with photographs of engine in various industrial uses, the publication also includes photographic diagrams of the product. Bulletin 3-159.

VITREOUS ENAMEL PRODUCTS.—Horace R. Whittier Co. Blue Book listing some 3000 2½ x 10 in. porcelain enamel stock signs, in what is claimed to be the most complete library of stock sign stencils offered to the trade. Bulletin 3-160.

GRINDING.—Carboloy Co., Inc. New 18 x 12 wall chart presenting most efficient forms for grinding single point Carboloy tools. Contains recommendations on grinding wheels, diamond wheels, diamond lapping discs, wheel speeds, rough and finish grinding procedure, and methods for hogging off stock rapidly. Bulletin 3-161.

SWITCHBOARD STYLING.—General Electric Co., Schenectady, N. Y. Booklet illustrating and describing various types of modern streamlined switchboard panels. Bulletin 3-162.

ELECTRIC MOTOR BEARINGS.—Johnson Bronze Co. Catalog illustrating over 200 individual bearings and listing specifications. Contains sections covering bronze cored and solid bars, hexagon bars, lead-base and tin-base babbitt, and phosphor bronze bearings. Price list also included. Bulletin 3-163.

RECORDING INSTRUMENTS.—C. J. Tagliabue Mfg. Co. Catalog covering thermometers (etched stem) and hydrometers. Descriptive text, illustrations, specifications, engineering data and prices are included. Bulletin 3-164.

REFRACTORIES.—Quigley Co., Inc. Folder describing Insuline, low heat storage refractories, for use in dry, plastic, molded or formed shapes. Bulletin 3-165.

FIRE BRICK.—A. P. Green Fire Brick Co. Booklet describing the process by which fire brick is made in a modern plant. Written in narrative form, and illustrated in connection with the text, the reader is taken from the clay pits to the finished brick. Bulletin 3-166.

MATERIALS HANDLING.—Louden Machinery Co. Catalog in 48 pages covering Louden's monorack equipment for overhead conveying systems. Various sections, curves and switches are explained and diagrammed, with specifications listed. Bulletin 3-167.

WHEELS.—Geneva Metal Wheel Co., 55-page catalog describing and illustrating various wheels for rubber tires, spoked steel wheels, and accessories and special parts. Diagrams, specifications and list prices are included. Bulletin 3-168.

FLOW METERS.—Brown Instrument Co. Catalog covering complete line of indicating, recording and integrating meters, in both electrical and mechanical types. Application to various uses is explained, and illustrated. Bulletin 3-169.

STEAM CONDUIT SYSTEM.—H. W. Porter & Co. Booklet showing steps in installation of Thermo-O-Tile Underground Steam Conduit System. Bulletin 3-170.

ELECTRODES.—Electroloy Co., Inc., Inc. Specification sheets and price lists for

Electroloy alloys for resistance welding electrodes and dies. Spot, seam, flash, butt and projection welding covered. Bulletin 3-171.

TEMPERATURE CONTROL.—Automatic Temperature Control Co., Inc. Bulletin describing current-input controller for regulating electrically heated devices such as furnaces, ovens and platens. Contains information regarding different applications, and wiring diagrams and ratings. Bulletin 3-172.

VALVES.—Galland-Henning Mfg. Co. Booklet describing and illustrating Nopak air operating valves, water and low-pressure valves, hydraulic operating valves. Contains price lists and dimensions, suggested uses, illustrations of installations and various cycles of operation. Bulletin 3-173.

UNIT HEATER.—Modine Mfg. Co. Booklet discussing use of unit heaters in industrial modernization. Features are discussed and illustrated. Illustrations of unit in use are included as well as specifications. Bulletin 3-174.

REAMER.—National Twist Drill & Tool Co. Folder describing "Boreamer", listing advantages and specification. Illustrated. Bulletin 3-175.

CHIMNEY MAINTENANCE.—Weber Chimney Co. Folder discussing reconditioning of reinforced concrete chimneys. Illustrated. Bulletin 3-176.

LIFT TRUCKS.—Yale & Towne Mfg. Co. Folder illustrating and describing hand lift trucks and skid platforms. Bulletin 3-177.

BOILERS.—Combustion Engineering Co., Inc., 34-page catalog covering line of bent-tube boilers. Cross-sections of typical installations of various types are included, as well as descriptive matter, photographs of furnace and boiler details, and shop views. Bulletin 3-178.

WATER METERS.—Worthington Pump & Machinery Corp. Bulletin describing three and four-inch, heavy-duty, disc-type, water meters. Illustrated and contains specifications and cross section views. Bulletin 3-179.

*If you want your new catalog or literature listed here
send a copy to above address*

MACKLIN

Grinding Wheels



Modern railroad shop effects tremendous savings in grinding piston rods with **MACKLIN GRINDING WHEELS**. There is a Macklin Wheel that will "Protect Your Production" on every kind of grinding operation.

MACKLIN COMPANY

Manufacturers of Grinding Wheels

JACKSON, MICHIGAN, U. S. A.

Sales Offices:—Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

In the "junior" field too—
LINCOLN leads by a mile

**HERE'S
why**

LINCOLN QUALITY AT THESE LOW PRICES!

Think of it! A high grade Lincoln welder for as little as \$200.00! Is it any wonder that these "Junior" welders are in such demand? Shops that are starting to arc weld and shops that have been arc welding for years—welding users, small and large, by the hundreds—are hooking up these powerful little motor generator welders to the line and are discovering new short-cuts to profits.

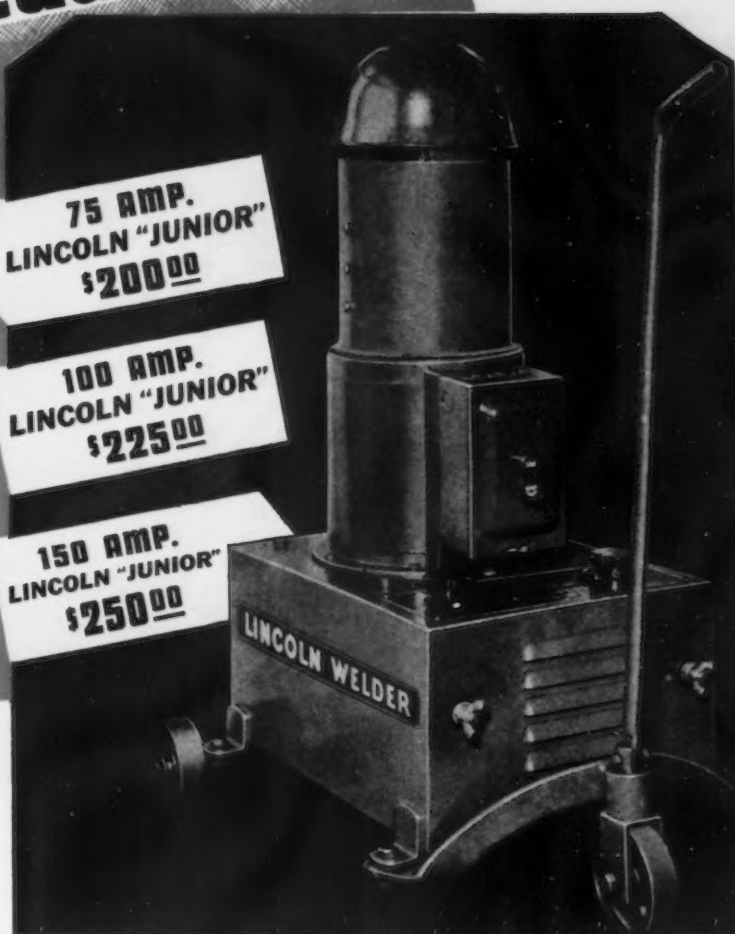
These Lincoln "Juniors" embody the same high quality workmanship and materials as the larger Lincoln welders. ★ Vertical design makes them compact—they occupy a floor space less than 2 ft. square. ★ They have Dual Arc Control with Plus Zone Range. ★ Heavy duty motor has long-lived ball bearings. ★ Commutator and brush wear is minimum because peripheral speed is low.

The coupon will bring you all the facts about these four-star actors—the most popular welding performers in the low-price field.

75 AMP.
LINCOLN "JUNIOR"
\$200⁰⁰

100 AMP.
LINCOLN "JUNIOR"
\$225⁰⁰

150 AMP.
LINCOLN "JUNIOR"
\$250⁰⁰



TYPE	N. E. M. A. RATING	RANGE IN AMPS.	PRICE* (F. O. B. CLEVELAND, O., Freight allowed and prepaid)
SA-75	75 amps.	20-100	\$200.00
SA-100	100 amps.	30-125	\$225.00
SA-150	150 amps.	45-200	\$250.00

*Portable parts are \$8.00 additional.



**MAIL THIS COUPON
TODAY!**

THE LINCOLN ELECTRIC COMPANY, Dept. X -360, Cleveland, Ohio
Send details concerning the ☐ SA-75 ☐ SA-100 ☐ SA-150 (check which).

To be used for

Name

Position

Company

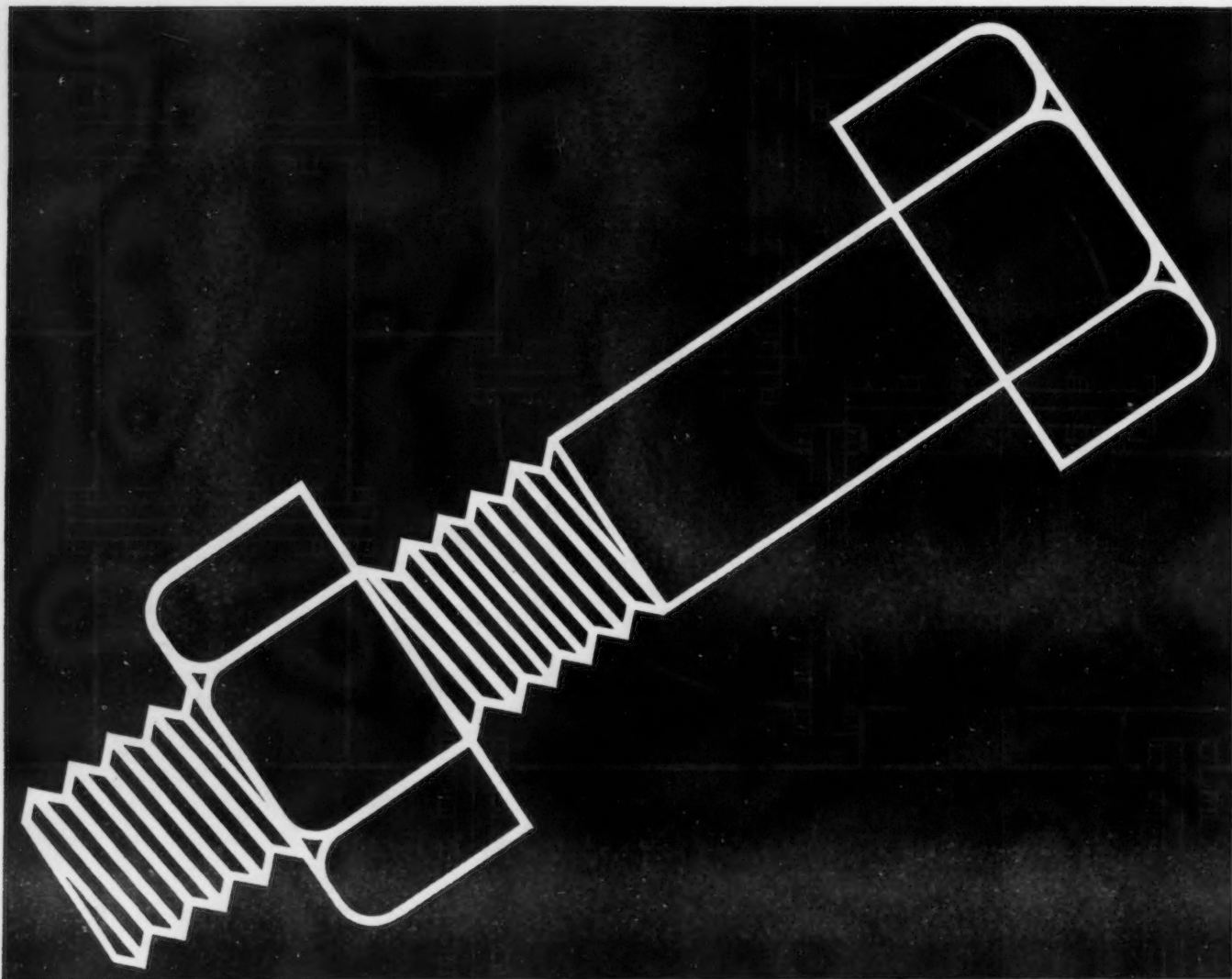
Address

City

State

LINCOLN

Largest Manufacturers of
Arc Welding Equipment in the World



"Take care of the pennies . . ."

ONE bolt is small, and comparatively inexpensive — either to buy or to make. But — bolts "in the mass" can easily represent a very considerable outlay. The saving of even a small fraction of a cent in the production cost may come to a substantial sum in the aggregate.

For example: One concern has standardized on Chrome-Moly (SAE 4140) bolts because they are easier to machine — resulting in savings on both tool

expense and machining time. In addition, their improved physical properties assure better service performance.

Moly steels are cutting production costs throughout industry because they are more economical to fabricate — whether the process be heat-treating, forging, carburizing, or machining. . . . They also impart to finished products higher quality, resulting in better service.

Our free technical book, "Molybdenum," will prove useful to engineers and production heads interested in cost cutting and product improvement. Our monthly news-sheet, "The Moly Matrix," keeps readers informed on Moly developments. Consult our laboratory when ferrous problems get tough. Climax Molybdenum Company, 500 Fifth Avenue, New York City.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

Climax Mo-lyb-den-um Company

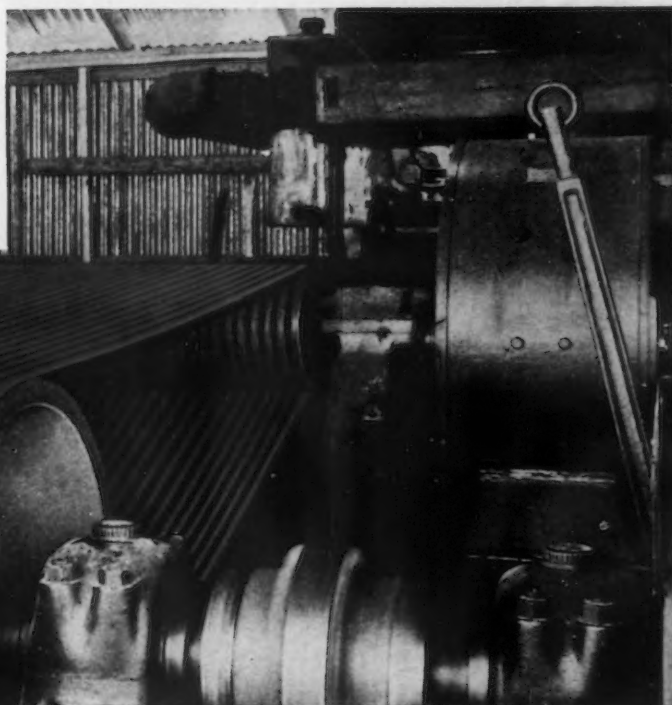
MOLY

Smooth . . . as Constant . . . as the Motor

CONDOR WHIPCORD V-BELTS



Portable Diesel Electric Oil Drilling Unit.
26 Condor V-Belts from engine to countershaft.



Drives are in tune with the motor when they're equipped with Condor Whipcord V-Belts because their 9-Point Balanced Construction* embodies a strength member that maintains firmness, low stretch, flexibility on the toughest drives.

By placing the endless whipcord strength member in the neutral axis area with an extensible section above and a compression section below—an exclusive Manhattan design—Condor Whipcord V-Belts reduce internal breakdown and deterioration . . . add longer service life and highest operating economy.

*9-Point Balanced Construction

1. Minimum Inelastic Stretch.
2. Wide Margin of Strength.
3. Uniform Flexibility.
4. Maximum Resistance to Structural Breakdown.
5. Smooth Running.
6. High Resistance to Side Wear.
7. Maximum Traction.
8. Correct Lateral Reinforcement.
9. Matched Length.

Condor

PRODUCTS

Transmission Belt
V-Belt
Conveyor Belt
Air Hose
Contractors Hose
Sand Blast Hose
Suction Hose

Fire Hose
Hydraulic Hose
Steam Hose
Water Hose
Chute Lining
Launder Lining

Industrial Brake Blocks
and Lining
Molded Rubber Goods
Rubber Lined Tanks
Rubber Covered Rolls
Rubber Bonded
Abrasive Wheels



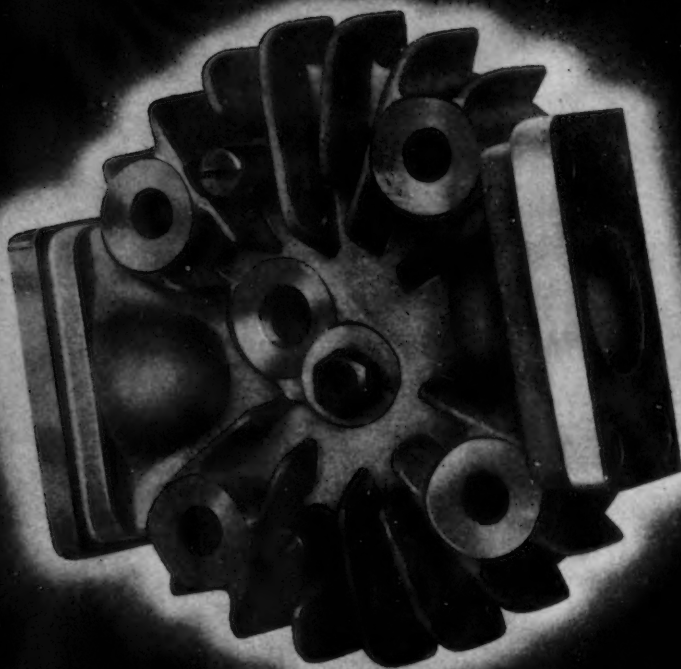
SOLD BY LEADING JOBBERS

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.

EXECUTIVE OFFICES AND FACTORIES, 43 TOWNSEND ST., PASSAIC, N. J.

TAMCO

Better performance thru better metals



TAM
Foundry
FERROTITANIUM



UNIFORM *Strength*

Titanium acts in three distinct ways to increase the strength of a casting, and make this strength more uniform even in thick sections . . . First, Titanium has a graphitizing effect. This produces a finer, denser grain structure and greater tensile strength . . . Titanium, secondly, as a result of its graphitizing and deoxidizing power, diminishes chilling of the cast iron, and insures slower setting and good life . . . Thirdly, Titanium—due probably to its purifying action in respect to oxygen and nitrogen—eliminates gas layering or films of iron oxide between the crystals and a consequent break in grain continuity . . . Let a TAM Engineer explain how Titanium compounds can be adapted to your casting problems. TAM Metallurgical Alloys, for use with both ferrous and non-ferrous metals, include TAM Foundry Ferro-Titanium, TAM *Original* F. C. T. (Ferro Carbon-Titanium) No. 78, TAM *Low Carbon* Ferro-Titanium (both "40%" and "25%" titanium), TAM Webbite, TAM Cupro-Titanium and many others. May we furnish complete information?

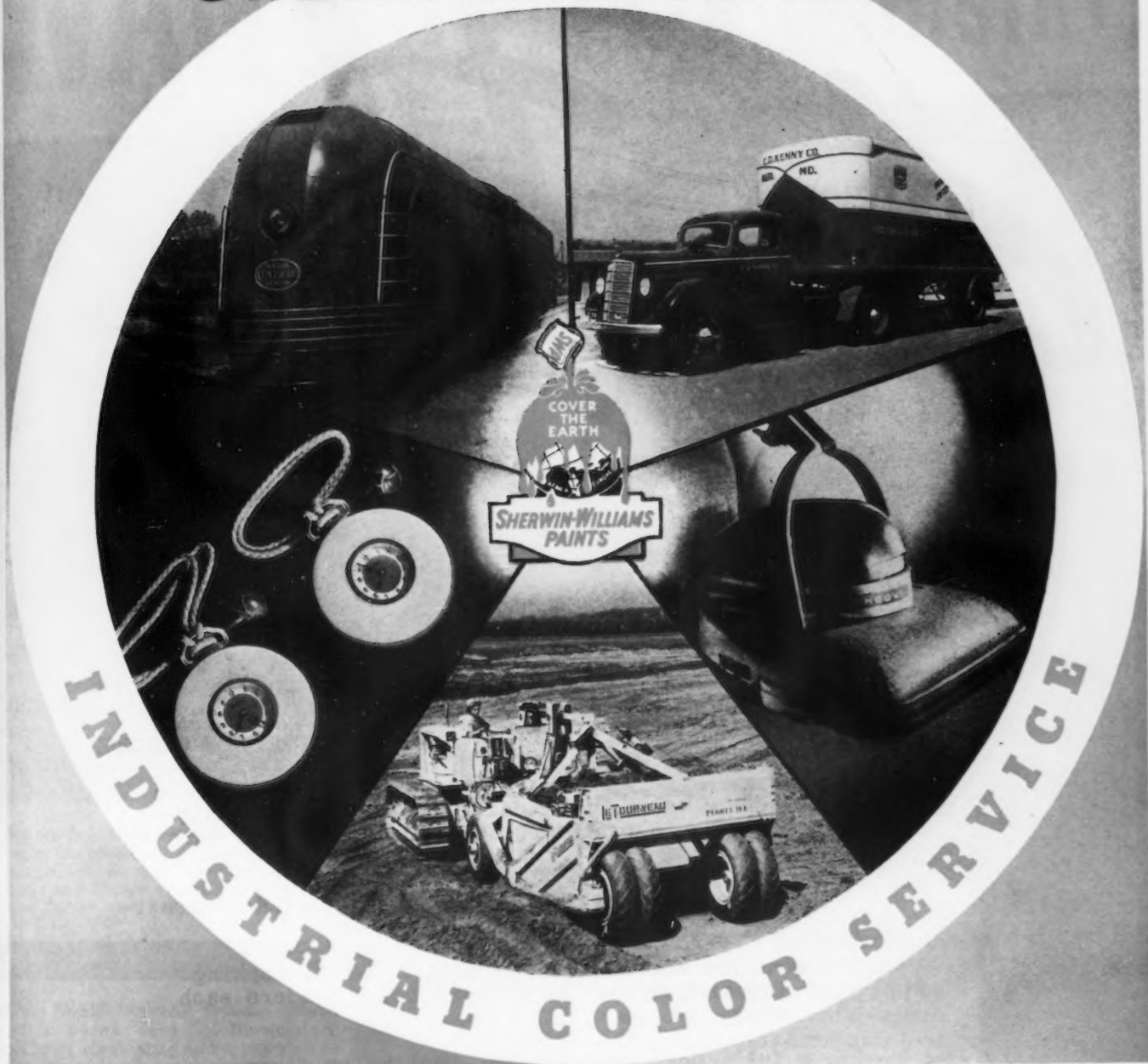


THE TITANIUM ALLOY MANUFACTURING CO.

GENERAL OFFICES AND WORKS . . . NIAGARA FALLS, N. Y., U. S. A.
EXECUTIVE OFFICES . . . 111 BROADWAY, NEW YORK CITY

Representatives for the Pacific Coast: BALFOUR, GUTHRIE & CO., San Francisco, Los Angeles, Portland, Seattle, Tacoma . . . *Representatives for Canada:* RAILWAY & POWER ENG. CORP., LTD., Toronto, Montreal, Hamilton, Winnipeg, Vancouver, Sydney . . . *Representatives for Europe:* T. ROWLANDS & CO., LTD., 23-27, Broomhall St., Sheffield, England

SHERWIN-WILLIAMS



Sherwin-Williams has cooperated with manufacturers and designers in the development of desired color effects and appropriate finishes on such outstanding items as the following—to name a few:

NEW YORK CENTRAL MERCURY

For sheer luxury, comfort, smart styling and colorful beauty the Mercury is unique. Credit New York Central's officials, Designer Henry Dreyfuss and Sherwin-Williams.

INGRAHAM LAPEL WATCHES

A best seller—attributed largely to S-W's Opex Lacquers and Kem Art Metal Finish.

LE TOURNEAU GRADING EQUIPMENT

Out in Peoria, Ill., they have found performance plus lasting beauty and protection helps sales. Colors by Sherwin-Williams.

HOOVER VACUUM CLEANER

A pleasing color; novel but not too startling; a color that is neutral; does not show dust; that suggests lightness and contrasts with the accenting blue band and dark gray motor housing—a "stratosphere

gray" and a crinkle finish by Sherwin-Williams. The new Hoover—styled by Henry Dreyfuss.

C. D. KENNY COMPANY TRUCKS

A color scheme that identifies, enhances appearance and streamline effect, and increases visibility—thus reducing accidents. Colors and finishes for Kenny transportation units by Sherwin-Williams.

Let the S-W Finish Engineer and Industrial Color Service be your source of aid. No cost or obligation. Write The Sherwin-Williams Co., Cleveland, Ohio, and all principal cities.

SHERWIN-WILLIAMS
INDUSTRIAL FINISHES

First!

THE FIRST PUBLICATION IN ANY INDUSTRIAL FIELD HAS A DECIDED ADVANTAGE OVER ALL OTHERS, BECAUSE OF ITS GREATER PRESTIGE, READER ATTENTION, AND ADVERTISING POWER. IN THE METAL-WORKING FIELD THE IRON AGE IS PRE-EMINENTLY FIRST.

A weekly with more reading pages than a monthly - 4061 pages published in 1936 - average 80 each week.

A reader interest winner - in 34 out of 44 investigations Iron Age was first choice.

A reader volume unmatched in the metal-working industry - over 70,000 executive readers each week.

A fully paid circulation - 84% being firms.

A substantial subscription price commensurate with editorial worth - \$6 a year - straight - no free list.

A remarkable subscription renewal record - 82%.


Another record for voluntary mail order subscriptions - 89%.

An advertising volume that tops all others, 4372 advertising pages printed in 1936 - 600 advertisers regularly using the paper and increasing daily.


AND AN OPPORTUNITY TO SECURE ADVERTISING SPACE IN THE FIELD'S FIRST PUBLICATION AT 17 CENTS PER PAGE PER HUNDRED READERS -

A "BUY" UNMATCHED BY ANY OTHER BUSINESS PAPER

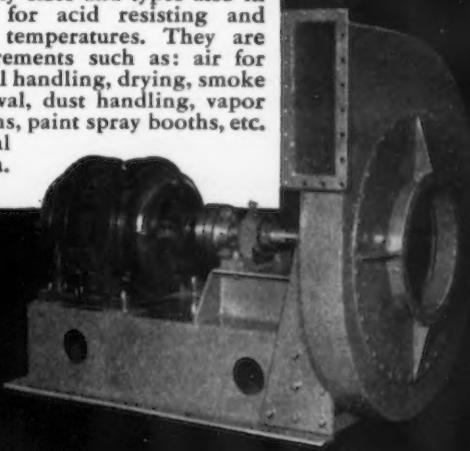
WANTED TOUGH PROBLEMS FOR AIR IN INDUSTRY!



Foundry Fumes Sap Strength but not in this foundry. Giant hood over each process are connected by ducts to powerful American Blower High Speed Fans. Excessive heat, dust and fine particles are carried away as fast as they originate.



Arc welding, 1,000 pieces a day in a plant that was originally designed for a quarter of present production is a tough job for men and machines. American Blower Fans and Blowers clear the air of excessive heat, smoke and fumes and keep production moving at a fast clip.



American Blower Industrial Pressure Blower. American Blower Fans and Blowers are available in many sizes and types also in special metals for acid resisting and handling high temperatures. They are used for requirements such as: air for cupolas, material handling, drying, smoke and fume removal, dust handling, vapor absorption, ovens, paint spray booths, etc. Write for special catalogs and data.

FOR OVER 50 YEARS American Blower engineers have been Air Technicians to industry. During this time thousands of American Blower Fans and Blowers have been installed in the metal working field, the steel industry, chemical industry, in flour mills, food factories, mines, glass plants and paint shops. Many seemingly impossible problems have been solved in air handling, material handling and air conditioning. This experience is available to you. If you have a tough problem for air, call in an American Blower engineer. Let him help you clear the air in your business. Write us today.



BAD AIR IS BAD BUSINESS
GOOD VENTILATION IS GOOD BUSINESS

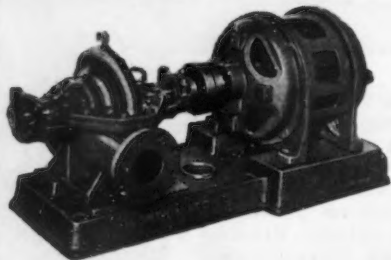
AMERICAN BLOWER CORPORATION

Division of American Radiator and Standard Sanitary Corp.

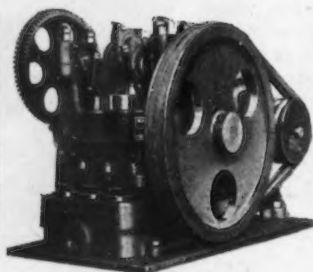
6000 RUSSELL ST. • DETROIT, MICHIGAN

WORTHINGTON

THE MOST COMPLETE LINE OF PUMPS . . . a size and type for every job



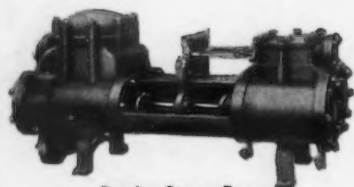
Split-casing Centrifugal Pump
Capacities to 3000 g.p.m.
Heads to 575 ft.



Triplex Power Pump
Capacities to 50 g.p.m.
Pressures to 250 lb./sq. in.



Monobloc Centrifugal Pump
Capacities to 1100 g.p.m.
Heads to 280 ft.



Duplex Steam Pump
Capacities to 420 g.p.m.
Pressures to 350 lb./sq. in.



Rotary Pump
Capacities to 2500 g.p.m.
Viscosities to 500,000 S.S.U.



Turbine Deep Well Pump
Capacities to 6000 g.p.m.
Heads to 600 ft.



Freflo Centrifugal Pump for liquids containing solids
Capacities to 7500 g.p.m. Heads to 135 ft.

THESE pumps are representative of a comprehensive line . . . from which the proper selection to meet any individual condition can be made, without prejudice or compromise.

Every unit is expertly engineered, embodying modern features proved in service . . . and is built to exacting standards.

There is a Worthington Dealer or District Office near you

● Literature available

WORTHINGTON PUMP AND MACHINERY CORPORATION
General Offices: HARRISON, NEW JERSEY

JUST BETWEEN US TWO

Slumbering Slogans

SLOGANS are not dead nor even hibernating, says J. Henry Smythe, Jr., sloganeer, in *Printers' Ink*. This is good news to us for we have been waiting for an excuse to dust off our own shrinking violet, "**The World's Greatest Industrial Paper**," and spring it again on a waiting world.

But we are afraid Mr. Smythe is merely grinding his own axe. We went through a recent extra-fat issue of The Iron Age and among all the advertisements all we could find was one slogan and a sickly one at that. We recall that in the recent presidential election both sides were liberally provided with slogans—"Only X days left to save America," and so on, but voters seemed to be able to take them or leave them alone, and they apparently didn't do any harm or good, depending on how you look at it.

The only slogan we have heard recently that gets below the cuticle is the one used on traffic signs, "*Children should be seen and not hurt.*" So perhaps we had better keep our own modest gem in moth balls a little longer until times prove whether Mr. Smythe is, as we suspect, simply hoping.

Cash for Copies

EVERY time we get a letter asking if we can use, at a price, old volumes of *The Iron Age*, we think of Rolls-Royce's gallant gesture. They are said to have bought up old models whenever they appeared on the used car market, in order to keep the Rolls-Royce name bright and shining.

But we have a complete set ourselves, so all we can do is to write apologetically that if we hear of anyone. . . Now along comes an inquiry from Buchhandlung Gustav Fock, Postschliessfach 100, Leipzig, Germany, for a quotation on volumes from 1855 to 1935. If you can help Herr Fock in his hour of need you might drop him a line.

Nightmare

SOME nights we wake up in a cold sweat, dreaming that in a moment of emergency we searched frantically but couldn't lay our hands on a single blurb. Actually, of course, this cannot happen, for it takes only three seconds to conceive, develop and deliver a blurb.

Naturally if little thought is given to them they are likely to be bald and blatant, as, for example, "No other trade paper has as many editorial pages as The Iron Age," or "The Iron Age is No. 1 in advertising volume."

But we don't like them much, for they lack suavity and remind us too much of what the colored gentleman said when asked what he thought of the new preacher, "*I ain't made up my mind, but he sure do recommend hisself highly.*"

Our preference is a forthright sunflower from an outside source. As, for example, a well-known industrial power transmission authority's comment on the series, "*The Economics of Industrial Power Transmission*," now running in *The Iron Age*:

"I consider that you have the best man in the country for the job which you have set out to do, and one which you might like to know is, in my opinion, a most important job to be done."

Carpet Call

ANY minute now we expect the Oberleutnant to request us firmly to abjure "trade paper" and to change to "business paper." In the lush '20s the brass hats in this industry got together, decided that "trade paper" was too commonplace for their product and agreed on the loftier term, "business paper."

But along came the cold blasts of the depression, chilling and exposing the bones of the collective trade press, so that even the brass hats did not seem to care much whether their wards were called one name or another.

However, boney angles are once more turning into graceful curves, so the heat will doubtless be turned on again. The Oberleutnant may even suggest to us aggressively that "ad" is an abominable and unbecoming abbreviation and that the 13-letter word be used here hereafter.

Neither term affects our blood pressure one way or the other. What does cause us to bust the sphygmomanometer is the abortion "write-up." Oblivion is too good for it. One of our ancestors must have been frightened by one.

—A.H.D.

THIS PROFITABLE GOING BUSINESS FOR SALE AT A GREAT SACRIFICE!

Will your heirs have to advertise as above in order to pay estate taxes? It has happened time and again. A public market in the shares of your company might remove this hazard—a hazard every business man may well consider under conditions that exist today. Creating a public market for your stock would:

- (1) Create a collateral loan value for your stock
- (2) Make it possible to greatly diversify your own investments
- (3) Make it easier for your company to sell additional stock and secure funds easily and quickly for expansion, improvements and equipment

Profitable companies that are largely privately owned can take advantage of the favorable conditions existing today to create a public market in their stocks. As experienced investment bankers we would be glad to discuss the matter with you. Your inquiry is invited with no obligation. Write:

RAWSON LIZARS & CO.

Members Chicago Stock Exchange
135 South La Salle Street, Chicago

Duplication

The fully paid subscription list of The Iron Age reads like the roll call of worthwhile metal working factories, plants and mills.

Any other metal-working publication striving for plant circulation, whether paid or free, must necessarily approach this same group comprised of Iron Age subscribers of long standing,

Lift for less with **CURTIS** CRANES AND AIR HOISTS



*This Curtis Crane and Air Hoist installed at a cost less than 1/2 the wages of one man enables two men to do the same work as previously done by a gang.
Griffin Wheel Co., Chicago*

The air-power principle, plus the long experience of Curtis in designing cranes and hoists, provide the most economical and efficient lifting power available. The low cost of installation and operation makes them the logical type for many classes of industries with lift, push, or pull jobs to perform.

Curtis Cranes have large diameter, roller bearing wheels, light weight pressed steel one-piece ends, and are exceptionally easy-running.

Curtis Air Hoists can spot to a hair's breadth, using unskilled labor. Damage cannot result from overload. They are immune to injury from fumes or adverse atmospheric conditions. Upkeep is negligible. They are safe and dependable.

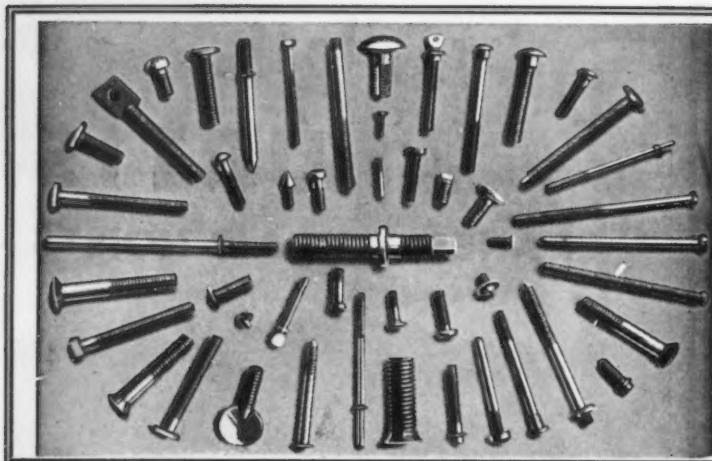
Write for surveys revealing remarkable service and low-cost performance records of Curtis Cranes and Air Hoists. Similar savings may be possible in your own plant.

CURTIS PNEUMATIC MACHINERY CO.

1948 Kienlen Ave., St. Louis, Missouri
New York — Chicago — San Francisco

CURTIS

COMPRESSORS—AIR HOISTS
I-BEAM CRANES and TROLLEYS



WHEN IN NEED OF

MACHINE SCREWS SPECIAL STUDS
MACHINE SCREW NUTS SPECIAL SCREWS

COMMUNICATE WITH
THE HOUSE OF SERVICE

THE PROGRESSIVE MANUFACTURING CO.
TORRINGTON, CONN.

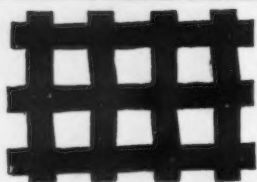
We please those discriminating manufacturers who not only demand quality but service as well. Business goes where it is invited and remains where it is well treated. The illustration reveals a few only of the possibilities that are developed by the cold heading process.

LEE-BUILT SPRINGS

A little higher — A lot better



COMPRESSION — EXTENSION — FLAT — TORSION — WIRE FORMS — STAMPINGS
LEE SPRING CO., Inc. 30 Main Street, Brooklyn, N. Y.



MICHIGAN WIRE CLOTH CO.

ESTABLISHED 1864

EVERYTHING IN WIRE CLOTH

Pioneers in the manufacture of DOUBLE CRIMP WIRE CLOTH and WIRE SCREENING of every kind possible to weave, made of Steel, Iron, Brass, Copper, Bronze, Aluminum, German Silver, Pure Nickel, Galvanized, Tinned, Monel, Manganese, Zinc and Stainless Steel; also Wire Lath, etc. Also drawers of Brass, Copper, Bronze, German Silver, Pure Nickel, Aluminum, Monel Metal, Wire, etc.

2117 HOWARD STREET, DETROIT, MICH.

Write for Catalogue No. 25

TRACK SPIKES
BOAT SPIKES
DOCK SPIKES
GUARD SPIKES
TRACK BOLTS

STEEL BARS IRON
DEFORMED REINFORCING

W. AMES & CO.

ESTABLISHED 1859

ROLLING MILL
FACTORY

JERSEY CITY, N. J.

WAREHOUSE
OFFICE

MACHINE BOLTS
TIE RODS
WASHERS
SPLICE BARS
RIVETS—NUTS



THE ATHENIA STEEL CO.

135 William Street, New York

Works, Athenia, N. J.

Makers of High Grade Tempered and Polished Steel for Clock, Watch, Motor and Typewriter Springs. Also Wound Springs. Tempered and Untempered Steel for other purposes. Special quality equal to finest imported for finish and accurate rolling. Also Stainless Steels of various grades.

AGENTS:—

Lapham Hickey Co.—3333 W. 47th Place, Chicago, Ill.—414 United Artists Bldg., Detroit, Mich.
E. F. Krause & Co.—430-440 Commercial St., Los Angeles, Calif.
Hill Chase & Co.—Richmond and Ontario Sts., Philadelphia, Pa.
Wetherell Bros. Co.—251 Albany St., Cambridge, Mass.

Check These Specifications

If an industrial publication has enough paid circulation to cover its market adequately; if its subscription price is as high as \$6 per year; if 89% of its subscribers send in their subscription orders voluntarily by mail; if 82% of its subscribers renew their subscriptions each year—such a paper has the attention of its readers and is an excellent advertising medium.

In the metal-working industry that paper is The Iron Age.

CROSBY for STAMPINGS

Serving Industry Since 1896



ALL our efforts have been concentrated on one product — **STAMPINGS**—for 40 years. We have made stampings, deep, intricate, heavy, light, large and small, for nearly every branch of industry.



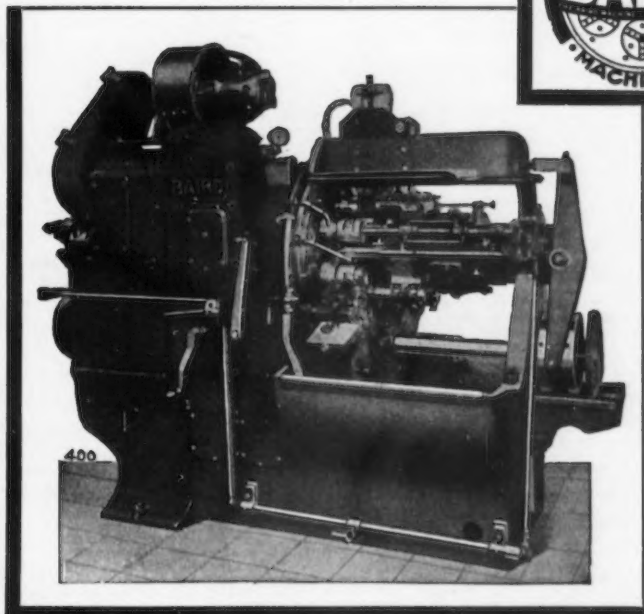
Get Acquainted With Crosby Service

THE CROSBY COMPANY

General Offices and Works: **BUFFALO, NEW YORK**

Branch Offices: Chicago Detroit Cleveland New York Philadelphia

Save by Accurate Machining



In building this Baird 7" Horizontal Automatic Chucking Machine our aim was to produce a machine that would turn out accurate work at a fast rate, and that would stay accurate after a long period of service. Customers tell us our aim too was accurate, as the machines achieved these results.

In addition to high spindle speeds the time for indexing including "air cuts" of the tools is only 2.15 seconds for single indexing. Accuracy of parts machined meets the inspection departments' O.K.

Baird Chucking Machines perform all the usual lathe operations and also drilling, milling slots or oil grooves, inserting bushings, etc. Flexibility in tool setups and in operation makes this machine a decided asset to your machine shop. For quotations or estimates—

"Ask Baird About It"

THE BAIRD MACHINE COMPANY

BRIDGEPORT, CONN.

Products Index

Products Index

Products Index

BORING MACHINES—Jig
Pratt & Whitney Div. Niles-Bement-Pond
Co., Hartford, Conn.

BORING & TURNING MILLS—Vertical
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Planer Co.

BOX STRAPPING

Acme Steel Co., Chicago, Ill.

BRAKE LINING AND BLOCKS—Asbes-

tos
Manhattan Rubber Mfg. Div. of Ray-

bestos-Manhattan, Inc., The, 2 Town-

send St., Passaic, N. J.

BRAKES—Electric
Cutler-Hammer, Inc., Milwaukee.

BRAKES—Electric & Mechanical
Clark Controller Co., The, Cleveland.

Electric Controller & Mfg. Co., The,
Cleveland.

BRAKES—Magnetic
Stearns Magnetic Mfg. Co., 626 So. 28th
St., Milwaukee.

BRAKES—Metal Forming
Cincinnati (Ohio) Snaper Co., The.

Dreis & Krump Mfg. Co., Chicago.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Steelweld Machinery Co., Cleveland.

BRICK—Fire Clay
Carborundum Co., The, Niagara Falls, N. Y.

Illinois Clay Products Co., Joliet, Ill.

Quigley Co., Inc., 56 West 45th St.,
N. Y. C.

BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty
St., New York City.

BRIDGE BUILDERS
American Bridge Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.

Belmont Iron Works, Philadelphia.

BRIDGE OPERATING MACHINERY—
Movable
Earle Gear & Mch. Co., Philadelphia.

BRICKS—Ferrolloy
Electro Metallurgical Sales Corp., 30 East
42nd St., N. Y. C.

BROACHES
Colonial Broach Co., Detroit, Mich.

BROACHING MACHINES
Bullard Co., The, Bridgeport, Conn.

Cincinnati (Ohio) Milling Mch. Co., The.

Colonial Broach Co., Detroit, Mich.

Oligear Co., The, 1311 W. Bruce St., Mil-

waukee.

BRONZE FOR DIES
Ameco Metal, Inc., Milwaukee, Wis.

BRONZE—Phosphor
Bunting Brass & Bronze Co., Toledo, Ohio.

Phosphor Bronze Smelting Co., The, Phila.

Revere Copper & Brass, Inc., 230 Park
Ave., N. Y. C.

Riverside (N. J.) Metal Co.

Seymour (Conn.) Mfg. Co.

BRUSHES—Machine
Pittsburgh Plate Glass Co., Brush Div.,
Baltimore, Md.

BRUSHES—Wire
Pittsburgh Plate Glass Co., Brush Div.,
Baltimore, Md.

BUCKETS—Clamshell
Erie (Pa.) Steel Construction Co.

Hayward Co., The, 50 Church St., N. Y. C.

Industrial Brownhois Corp., Bay City,
Mich.

BUCKETS—Electric Motor
Erie (Pa.) Steel Construction Co.

Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Elevat
Jeffrey Mfg. Co., The, Columbus, Ohio.

BUCKETS—Orange Peel
Erie (Pa.) Steel Construction Co.

Hayward Co., The, 50 Church St., N. Y. C.

BUFFERS & POLISHING MACHINES
Vonnegut Moulder Corp., 1807 Madison
Ave., Indianapolis, Ind.

BUILDINGS—Factory
Ferguson, H. K. Co., The, Cleveland.

BUILDINGS—Steel
American Bridge Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.

Belmont Iron Works, Philadelphia.

Bethlehem (Pa.) Steel Co.

Ferguson, H. K. Co., The, Cleveland.

BULLDOZERS
Beatty Mch. & Mfg. Co., 936-150th St.,
Hammond, Ind.

Steelweld Machinery Co., Cleveland.

BULLDOZERS—Hydraulic
Elmes, Chas. F., Engng. Wks., Chicago.

BURNERS—Oil or Gas
Wilson, Lee Engineering Co., The, Cleve-

land.

BUSHINGS—Bronze
Ameco Metal, Inc., Milwaukee, Wis.

Bunting Brass & Bronze Co., Toledo, O.

Johnson Bronze Co., 505 So. Mill St., New
Castle, Pa.

Lawrenceville Bronze Co., Pittsburgh.

Phosphor Bronze Smelting Co., The, Phila.

Shenango-Penn Mold Co., Pittsburgh.

BUSHINGS—Oilless
Rhoades, R. W., Metaline Co., Inc., Long
Island City, N. Y.

BUSHINGS—Phosphor Bronze
Bunting Brass & Bronze Co., Toledo, Ohio.

Phosphor Bronze Smelting Co., The, Phila.

**BY-PRODUCTS COKE AND GAS
OVENS**
Koppers Co., Pittsburgh.

CABINETS—Steel
Frick-Gallagher Mfg. Co., The, Wellston,
Ohio.

CABLE—Electric
General Electric Co., Schenectady, N. Y.

Simplex Wire & Cable Co., Cambridge
A. Boston, Mass.

CABLEWAYS AND TRAMWAYS—See
Tramways

CADMIUM
Du Pont de Nemours, E. I. & Co., Inc.,
Grasselli Chemicals Dept., Wilmington,
Del.

Udylite Co., The, Detroit.

CADMIUM PLATING PROCESS
Du Pont de Nemours, E. I. & Co., Inc.,
Grasselli Chemicals Dept., Wilmington,
Del.

Udylite Co., The, Detroit.

CALCIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East
42nd St., N. Y. C.

CALCULATING MACHINES
Monroe Calculating Machine Co., Inc.,
Orange, N. J.

CARBIC
Linde Air Prods. Co., The, 30 East 42nd
St., N. Y. C.

CARBIDE
Air Reduction Sales Co., 60 East 42nd
St., N. Y. C.

Linde Air Prods. Co., The, 30 East 42nd
St., N. Y. C.

CARBIDE—Boron
Norton Co., Worcester, Mass.

CARBURIZING—See Heat Treating

CARS—Industrial and Mining
Atlas Car & Mfg. Co., The, Cleveland.

Bartlett, C. O., & Snow Co., The, Cleveland.

CASE HARDENING—See Heat Treating

CASTINGS—Acid or Heat Resisting
Ameco Metal, Inc., Milwaukee, Wis.

Duriron Co., Inc., The, 438 N. Findlay
St., Dayton, Ohio.

Hoskins Mfg. Co., Detroit, Mich.

Lebanon (Pa.) Steel Foundry.

Midvale Co., The, Nicetown, Phila., Pa.

Mechanite Metal Corp., Pittsburgh.

CASTINGS—Alloy Steel
Bissett Steel Co., The, Cleveland.

Lebanon (Pa.) Steel Foundry.

Mackintosh-Hemphill Co., Pittsburgh.

Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Brass, Bronze, Copper or
Aluminum
Cadman, A. W., Mfg. Co., Pittsburgh.

Carbon Malleable Casting Co., Inc., Lan-

caster, Pa.

Lawrenceville Bronze Co., Pittsburgh.

Phosphor Bronze Smelting Co., The, Phila.

Snyder, W. P., & Co., Pittsburgh.

Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—Corrosion Resisting
Meehanite Metal Corp., Pittsburgh.

Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Die, Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Electric Steel
Industrial Steel Casting Co., The, Toledo.

Lebanon (Pa.) Steel Foundry.

CASTINGS—Gray Iron
American Engineering Co., Philadelphia.

Cheney, S., & Son, Smith, N. Y.

Midvale Co., The, Nicetown, Phila., Pa.

Murray Iron Wks. Co., Burlington, Iowa.

National Roll & Fdry. Co., Avonmore, Pa.

North Wales (Pa.) Mach. Co., Inc.

Spencer's, I. S., Sons, Inc., Guilford, Ct.

Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

CASTINGS—High Test & Alloy Iron
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave.,
Midland, Mich.

CASTINGS—Malleable
Carbon Malleable Casting Co., Inc., Lan-

caster, Pa.

Lake City Malleable Co., The, 5100
Lakeside Ave., Cleveland.

Malleable Iron Fittings Co., Branford, Ct.

Peoria (Ill.) Malleable Castings Co.

CASTINGS—Meehanite Metal
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Monel & Nickel
Superior Bronze Corp., Erie, Pa.

CASTINGS—Semi-Steel
Malleable Iron Fittings Co., Branford, Ct.

CASTINGS—Steel
Bethlehem (Pa.) Steel Company.

Carnegie-Illinois Steel Corp. (U. S. Steel
Corp. Subsidiary), Pittsburgh & Chi-

cago.

Columbia Steel Co. (U. S. Steel Corp.
Subsidiary), San Francisco, Calif.

Crucible Steel Castings Co., Lansdowne, Pa.

Industrial Steel Castings Co., The, Toledo.

Lebanon (Pa.) Steel Foundry.

Mackintosh-Hemphill Co., Pittsburgh.

Malleable Iron Fittings Co., Branford, Ct.

Mesta Mch. Co., Pittsburgh.

Midvale Co., The, Nicetown, Phila., Pa.

Standard Steel Wks. Co., Burnham, Pa.

CASTINGS—Wear Resisting
Meehanite Metal Corp., Pittsburgh.

CEMENT—Arid-Proof
Atlas Mineral Products Co. of Pa., The,
Mertztown, Pa.

Pennsylvania Salt Mfg. Co., Philadelphia,
Pa.

CEMENT—Quick Setting, Acid Proof &
Insulator
Nukem Products Corp., 68 Niagara St.,
Buffalo, N. Y.

CEMENT—Refractory
Carborundum Co., The, Perth Amboy, N. J.

Quigley Co., Inc., 56 West 45th St.,
N. Y. C.

CEMENT—Rubber
Goodrich, B. F. Co., The, Akron, Ohio.

CHAINS—Conveyor & Elevator
Baldwin-Duckworth Chain Corp., Spring-

field, Mass.

Bartlett, C. O., & Snow Co., The, Cleveland.

Diamond Chain & Mfg. Co., Indianapolis,
Ind.

Jeffrey Mfg. Co., The, Columbus, Ohio.

CHAINS—Power Transmission
Baldwin-Duckworth Chain Corp., Spring-

field, Mass.

Boston Gear Works, Inc., North Quincy,
Mass.

Diamond Chain & Mfg. Co., Indianapolis,
Ind.

Cone 4-Spindle Automatics

Are economical and accurate producers of screw machine parts up to 6" diameter, 7" milling length. They cut costs, increase production, boost profits.

Write for particulars

CONE AUTOMATIC MACHINE CO., Inc.
WINDSOR, VERMONT

REPRESENTATIVES:

Detroit: J. C. Austerberry's Sons, 684 E. Congress St., Detroit, Mich.
Chicago: John E. Glover, 2127 North Sayre Ave., Chicago, Ill.
Ohio: S. B. Martin, 1977 Erie Cliff Drive, Lakewood, Ohio.
New England: Potter & Johnston Machine Co., Pawtucket, R. I.
Indiana: G. A. Richey, Chamber of Commerce Bldg., Indianapolis, Ind.
New York State: Syracuse Supply Co., Syracuse, N. Y.; also Buffalo, N. Y.
Pennsylvania: Arch Machinery Co., 1029 Park Bldg., Pittsburgh, Pa.
California: C. F. Bulotti Machinery Co., 829-831 Folsom St., San Francisco, Calif.

LELAND-GIFFORD COMPANY

Worcester, Mass.

Drilling Machinery
Belt and Motor Spindle
One to Six Spindles

Tapping Attachments and Multiple Heads

GOSS and DE LEEUW

MULTIPLE SPINDLE

CHUCKING MACHINES

Two, Four, Five Spindles • Work and Tool Rotating Types
GOSS & DE LEEUW MACHINE CO., NEW BRITAIN, CONN.

LUCAS "PRECISION"

Horizontal Boring, Drilling and Milling Machine

THE LUCAS MACHINE TOOL CO.



CLEVELAND,
OHIO, U.S.A.



Cutting Off
Machines for
Sawing All Kinds
of Metals

THE ESPEN-LUCAS MACHINE WORKS
FRONT AND GIRARD AVE., PHILADELPHIA, PENNA.

17 STYLES AND SIZES

MERRELL

PIPE THREADING MACHINES

for BETTER threads

TOLEDO, OHIO

In The IRON AGE
you contact 70,134 readers

Cutting-Off Machines

—for thin and thick wall steel tubing and bars

BARDONS & OLIVER

Cleveland, Ohio

We also manufacture a large line of turret machinery for finishing cast iron, steel and brass



Grinding
Polishing
Sanding
Drilling
Reaming



Nut Setting
Screw Driving
Rotary Filing
Stainless Steel
Weld Finishing

Flexible Shafts and Machines
Vertical and Horizontal Types— $\frac{1}{2}$ to 2 H. P.
Send for General Catalog

N. A. STRAND & CO.

5001 No. Lincoln St.

Chicago

THE CLEVELAND CO.

Punches, Dies, Chisels, Rivet Sets
660 E. 82nd St. Cleveland, O.

If it's RIVETED you KNOW it's safe

Famous for Quality of threads they produce, long life of chasers and all-around dependability.

Following literature available:
Bulletin on H & G General Purpose Die Heads.
Bulletin on New Insert Chaser Type of Die Heads.
Bulletin on H & G Threading Machines.

The Eastern Machine Screw Corp.
21-41 Barclay Street, New Haven, Conn.
Los Angeles: A. C. Behringer, 313-316 Commercial St.,
Los Angeles, Cal.
San Francisco: A. H. Coates Company, 1142 Howard St.,
San Francisco, Cal.



Die
Heads

SOMETHING NEW AND BETTER IN

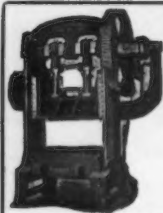
Write for complete details.

Beatty also builds punching and shearing machines, vertical bulldozers, coping machines, spacing tables, and the Hammond Neverlip Portable Floor Crane.

SHEET METAL SHEARS

NO FLYWHEEL
NO CLUTCH
NO TREADLE
ARC WELDED
NO COUNTER-WEIGHTS
NO MOTOR IDLING
AUTOMATIC HOLD-DOWN

BEATTY MACHINE & MFG. CO., 936-150th STREET HAMMOND, IND.



Robinson Sheet Metal Working Machinery

Inclinable Presses Gap Presses
Double Crank Presses Squaring Shears
Horning Presses Gap Shears
Toggle Presses Corrugating Machines
Hand and Power Brakes

NEW ALBANY MACHINE MFG. CO.
Sole Owner J. M. Robinson Mfg. Co.
New Albany, Ind.

THOMAS

SPACING MACHINE COMPANY
PITTSBURGH
PUNCHING AND SHEARING MACHINERY

Products Index

Jeffrey Mfg. Co., The, Columbus, Ohio.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.
CHAINS—Roller
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O., & Snow, Co., The, Cleveland
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.
CHAINS—Silent
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.
CHANNELS—See Angles, Beams, Channels and Tees
CHECKS—Metal
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.
CHEMICALS—Industrial
Du Pont de Nemours, E. I., & Co., Inc., Grasseville Chemicals Dept., Wilmington, Del.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
CHEMICALS—Rust Proofing
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udyllite Co., The, Detroit.
CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.
CHROMIUM PLATING—See Plating—Chromium
CHUCKING MACHINES—Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.
Goss & DeLeeuw Machine Co., The, New Britain, Conn.
National Acme Co., The, Cleveland.
CHUCKS—Air Operated
Hannifin Mfg. Co., Chicago.
CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The, Cushman Chuck Co., Hartford, Conn.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
CHUCKS—Electric
Cushman Chuck Co., Hartford, Conn.
CHUCKS—Lathe
Cushman Chuck Co., Hartford, Conn.
CHUCKS—Magnetic
Heald Mch. Co., Worcester, Mass.
Taft-Pierce Mfg. Co., The, Woonsocket, R. I.
CIRCLES—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila. Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Bailey, Wm. M., Co., Pittsburgh.
CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Detroit Rex Products Co., Detroit, Mich.
Ford, J. B., Co., The, Wyandotte, Mich.
Meaker Co., The, Chicago.
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.
Pennsylvania Salt Mfg. Co., Phila., Pa.
CLEANING COMPOUNDS—Alkali
Detroit Rex Products Co., Detroit, Mich.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
CLEANING EQUIPMENT—Metal
Detroit Rex Products Co., Detroit, Mich.
Meaker Co., The, Chicago.
CLEANING EQUIPMENT (Metal)—Electro-Chemical
Buller Co., The, Bridgeport, Conn.
Meaker Co., The, Chicago.
CLEANING MATERIALS—Glass
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.
CLOTHING—Asbestos & Fireproof
Safety Equipment Service Co., The, Cleveland.
CLUTCH-BRAKES—Magnetic
Stearns Magnetic Mfg. Co., 626 So. 28th St., Milwaukee.
CLUTCHES
Fairbanks, Morse & Co., Chicago.
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Medart Co., The, St. Louis, Mo.
Morse Chain Co., Ithaca, New York.
CLUTCHES—Magnetic
Cutler-Hammer, Inc., Milwaukee.
Dings Magnetic Separator Co., Milwaukee.
Stearns Magnetic Mfg. Co., 626 South 28th St., Milwaukee.
CLUTCHES—Overrunning
Morse Chain Co., Ithaca, New York.
COAL
Cleveland-Cliffs Iron Co., Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Koppers Coal Co., Inc., The, Pittsburgh.
Pickands Mather & Co., Cleveland.
COAL ORE AND ASH HANDLING MACHINERY
Bartlett, C. O., & Snow, Co., The, Cleveland.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.
CORAL METAL
Central Trading Corp., 511 Fifth Ave., N. Y. C.
COILS—Pipe
Harrisburg (Pa.) Steel Corp.
Pittsburgh (Pa.) Piping & Equip. Co.
COKE—Metallurgical
Cleveland-Cliffs Iron Co., Cleveland, Ohio.
Pickands Mather & Co., Cleveland.
COKE OVEN MACHINERY
Atlas Car & Mfg. Co., The, Cleveland.
Koppers Co., Pittsburgh.
COKE OVENS—By-Products
Koppers Co., Pittsburgh.

COKE OVENS—Cross Regenerators
Koppers Co., Pittsburgh.
COKE OVENS—With Recovery of By-Products
Koppers Co., Pittsburgh.
COLLETS
Rivett Lathe & Grinder, Inc., Boston, Mass.
COLUMBIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
COMBUSTION CONTROLS
Morgan Construction Co., Worcester, Mass.
COMPOUNDS—Drawing
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
COMPRESSORS—Air
Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co., 11 Broadway, New York City.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Spencer Turbine Co., Hartford, Conn.
Sullivan Machinery Co., Michigan City, Ind.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.
COMPRESSORS—Gas
Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.
Sullivan Machinery Co., Michigan City, Ind.
COMPRESSORS—Rebuilt. (See Clearing House Section)
CONCRETE CONSTRUCTION
Ferguson, H. K., Co., The, Cleveland.
CONDENSERS—Surface & Jet
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
CONTRACTORS' SUPPLIES—Second-Hand. (See Clearing House Section)
CONTROLLERS—Crane
Cutler-Hammer, Inc., Milwaukee.
CONTROLLERS—Electric
Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
General Electric Co., Schenectady, N. Y.
CONTROLLERS—Valve, Electrically Operated
Cutler-Hammer, Inc., Milwaukee.
Vickers, Inc., 1420 Oakman Blvd., Detroit, Mich.
CONVEYING AND ELEVATING MACHINERY
Bartlett, C. O., & Snow, Co., The, Cleveland.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Link-Belt Co., Chicago.
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.
CONVEYOR WORMS
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
CONVEYORS—Flexible Wire Belt
Audubon Wire Cloth Corp., Phila., Pa.
CONVEYORS—Gravity
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
CONVEYORS—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
CONVEYORS—Portable
Jeffrey Mfg. Co., The, Columbus, Ohio.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.
COPING MACHINES
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
CORE OIL
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
CORUNDUM WHEELS—See Grinding Wheels
COTTERS AND KEYS—Spring
Hindley Mfg. Co., Valley Falls, R. I.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Western Wire Prods. Co., St. Louis, Mo.
COUNTERBORES
Cleveland (Ohio) Twist Drill Co., The, Morse Twist Drill & Mch. Co., New Bedford, Mass.
COUNTERS—Production
Durant Mfg. Co., Milwaukee, Wis.
Veeder-Root, Inc., Hartford, Ct.
COUNTERS—Revolution, Recording
Bristol Co., The, Waterbury, Conn.
Durant Mfg. Co., Milwaukee, Wis.
COUNTING MACHINES
Veeder-Root, Inc., Hartford, Conn.
COUPLINGS—Cut-off Friction
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
COUPLINGS—Flexible
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Lewley Flexible Coupling Co., Chicago.
Morse Chain Co., Ithaca, New York.
Waldron, John, Corp., New Brunswick, N. J.
COUPLINGS—Pipe
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

Products Index

CRANES—Crawling Tractor
Harnischfeger Corp., 4101 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, Ohio.

CRANES—Electric, Industrial, Truck Mounted
Baker-Hauling Co., 2175 W. 25th St., Cleveland.
Edwell-Parker Electric Co., The, Cleveland.

CRANES—Electric Traveling
Arnell, James P., Pittsburgh.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Conco Engineering Works, Mendota, Ill.
Erie (Pa.) Steel Construction Co.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.

Morgan Engineering Co., The, Alliance, O.
Northern Engineering Works, Detroit, Mich.
Robbins & Myers, Inc., Springfield, Ohio.

Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

Whiting Corp., Harvey, Ill.
CRANES—Gantry
Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Morgan Engineering Co., The, Alliance, O.
Whiting Corp., Harvey, Ill.

CRANES—Hand Power
American Monorail Co., The, Cleveland.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.

Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.

Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.

CRANES—Jib
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

Conco Engineering Works, Mendota, Ill.
Euclid Crane & Hoist Co., The, Euclid, O.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.

Whiting Corp., Harvey, Ill.
CRANES—Locomotive
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, O.

CRANES—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
CRANES—Portable
Canton Fry & Mch. Co., Cleveland.

CRANES—Portable Electric
Baker-Hauling Co., 2175 W. 25th St., Cleveland.
Edwell-Parker Electric Co., The, Cleveland.

CRANKSHAFTS
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Union Driven Steel Co., Massillon, Ohio.

CRUSHERS—Coal
Jeffrey Mfg. Co., The, Columbus, Ohio.
CUTTERS—Die Sinking
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

Tomkins-Johnson Co., The, Jackson, Mich.
CUTTERS—Keyseating
Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

CUTTERS—Milling
Brown & Sharpe Co., Providence, R.I.
Cleveland (Ohio) Twist Drill Co., The, Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.

Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

CUTTING-OFF MACHINES—Abrasive
Tabor Mfg. Co., Phila.
CUTTING-OFF MACHINES—Cold Saw
Espan-Lucas Mch. Wks., Philadelphia.

CUTTING-OFF MACHINES—Pipe or Tubing
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Bardons & Oliver, Cleveland.

Landis Mch. Co., Inc., Waynesboro, Pa.
CUTTING AND WELDING APPARATUS
—Oxy-Acetylene—See Welding and Cutting Machines and Equipment—Oxy-Acetylene.

CYLINDERS—Compressed Air & Hydraulic
Tomkins-Johnson Co., The, Jackson, Mich.
CYLINDERS—Seamless
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

DEGREASING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

DEGREASING MACHINES—Solvent
Detroit Rex Products Co., Detroit, Mich.
DEOXIDIZERS
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

DIE BLOCKS—Drop Hammer
Heppenstall Co., Pittsburgh.
DIE CUSHIONS—Hydro-Pneumatic
Marquette Tool & Mfg. Co., Toledo, Ohio.

DIE CUSHIONS—Pneumatic
Marquette Tool & Mfg. Co., Toledo, Ohio.
DIE-FILING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.

DIE SINKING MACHINES—Automatic and Hand
Cincinnati (Ohio) Milling Mch. Co., The, Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.

DIEING MACHINES—Automatic
Henry & Wright Mfg. Co., The, Hartford, Conn.

DIES—Drawing
Vanadium-Alloys Steel Co., Vascology-Ramet Div., North Chicago, Ill.

DIES—Drop Forge
Hartford (Conn.) Drop Forge Co., The, Taft-Petree Mfg. Co., The, Woonsocket, R. I.

DIES—Pipe Threading
Landis Mch. Co., Inc., Waynesboro, Pa.
DIES—Screw and Thread Cutting
Eastern Mach. Screw Corp., New Haven, Ct.

Greenfield (Mass.) Tap & Die Corp.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.

Murphy Machine & Tool Co., Detroit.
DIES—Self-Opening Adjustable
Eastern Mach. Screw Corp., New Haven, Ct.

Jones & Lamson Mch. Co., Springfield, Vt.
Murphy Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

DIES—Sheet Metal Working
Bliss, E. W. Co., Toledo, Ohio.
Worcester (Mass.) Stamped Metal Co.

DIES—Steel Letters and Stamps
Cunningham, M. E. Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

DISINFECTANTS
Huntington (Ind.) Laboratories, The
DRAWN WORK—Metal—See Stampings or Drawings—Metal

DRILL HEADS—Hydraulic
National Automatic Tool Co., Richmond, Ind.
DRILL HEADS—Multiple
Baker Bros., Inc., Toledo, Ohio.

Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.
DRILLING MACHINES—Bench
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Heavy Duty
Baker Bros., Inc., Toledo, Ohio.
DRILLING MACHINES—Multiple Spindle
Baker Bros., Inc., Toledo, Ohio.

Henry & Wright Mfg. Co., The, Hartford, Conn.
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spindle Adjustable
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spindle Horizontal
Baker Bros., Inc., Toledo, Ohio.
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Portable Electric
Buckeye Portable Tool Co., The, Dayton, O.
Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.

Wodack Electric Tool Corp., Chicago.
DRILLING MACHINES—Portable Pneumatic
Buckeye Portable Tool Co., The, Dayton, O.

Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.
DRILLING MACHINES—Upright
Baker Bros., Inc., Toledo, Ohio.

Cincinnati (Ohio) Bickford Tool Co., The, Cleerehan Machine Tool Co., Green Bay, Wis.

DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.
Cincinnati (Ohio) Bickford Tool Co., The, Cleerehan Machine Tool Co., Green Bay, Wis.

DRIVES—Gear
Farrel-Birmingham Co., Inc., Buffalo, N. Y.
Mesta Mch. Co., Pittsburgh.

DRIVES—Single & Multiple V-Belts
Allis Chalmers Mfg. Co., Milwaukee.
DROP FORGINGS—See Forgings—Drop, Iron or Steel

DROP HAMMERS—See Hammers—Drop
DUST COLLECTORS
Irasive Machine Tool Co., East Providence, R. I.

American Blower Corp., 6000 Russell St., Detroit.
American Foundry Equipment Co., The, 101 Park St., Mishawaka, Ind.

Pangborn Corporation, Hagerstown, Md.
Whiting Corp., Harvey, Ill.

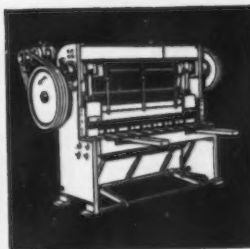
Reclinable POWER PRESSES

Among the many types of Zeh & Hahnemann presses the Reclinable Line meets the requirements for general stamping operations. They are reclinable to 40° and contain many improvements which contribute to strength, safety, ease of operation and high output. Send for bulletin.

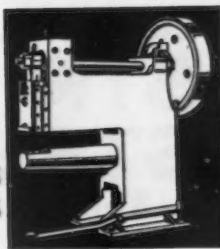


ZEH & HAHNEMANN CO.,
Avenue A and Vanderpool Street
NEWARK, N. J.

CHICAGO



STEEL
BRAKES
SHEARS
PRESSES
ALL TYPES
AND SIZES



DREIS & KRUMP MFG. CO.

7430 LOOMIS BLVD.

CHICAGO, ILL.

PRESSES
FEEDS
AUTOMATIC EQUIPMENT
THE V & O Press Co.
HUDSON, N. Y.

STANLEY STEEL

STEEL MAKERS SINCE 1871

BILLETS - SLABS - STRIP STEEL

THE STANLEY WORKS

NEW BRITAIN, CONN. - BRIDGEPORT, CONN. - HAMILTON, ONTARIO

MANGANO

NON
SHRINKABLE

DIE STEEL

ALSO
HIGH
SPEED
STAINLESS
& CARBON
TOOL STEELS

LATROBE ELECTRIC STEEL CO.
LATROBE PA.

High Grade STRIP STEEL

Stamping and Deep Drawing—Uniform in Quality

Control of the quality begins with the manufacture of the steel in our own Open Hearth and continues through all subsequent processes.

LACLEDE STEEL CO., ST. LOUIS
STEEL WORKS & ROLLING MILLS, ALTON and MADISON, ILL.

OFFICES: Detroit—Chicago—St. Louis—Kansas City

RYERSON-STEEL

Immediate shipment of all steel and allied products including bars, structurals, sheets, plates, tubing, alloy and tool steel, Allegheny stainless, babbitt, boiler tubes and fittings, welding rod and equipment, metal working tools, etc. Write for the Ryerson Stock List.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City



WETHERELL BROS. CO.

251 Albany St., Cambridge, Mass.

C. R. Strip

Stainless Steel

Tool Steel

O H Specialties

GRIFFIN

COLD ROLLED STRIP STEEL

½" to 19" wide.

.002" to .500" thick
Desired Quality for
Forming and Drawing

SALES AGENTS

NEW YORK CITY—Wm. H. Leonori & Co., Inc., 30 Howard St.
PHILADELPHIA—C. B. Tippet, 4308 North Broad St.
CHICAGO—Central Steel & Wire Co., 4545 South Western Blvd.
DETROIT—E. R. Wegener, 514 Stephenson Bldg.
CLEVELAND—Paterson-Letch Co., 900 East 69th St.
BUFFALO—J. J. Lambert, 323 Huntington Ave.
DAYTON—Central Steel & Wire Co., 1095 East Monument Ave.
SAN FRANCISCO—Charles L. Lewis, 703 Market St.

GRIFFIN MFG. CO. ERIE, PENNA.

CUT CUT CUT

Cut your Costs of Machining Steel

CUTANIT

FOR HIGH SPEED PRODUCTION

AMERICAN CUTTING ALLOYS, INC.

500 Fifth Ave., New York

63 Milwaukee Ave., Detroit

SCHLOSSER MFG. CO.
PHILADELPHIA, PA.

ECLIPSE COUNTERBORE CO.
DETROIT & BRANCHES

STAINLESS STEEL TUBING

LARGE STOCKS STANDARD AND PIPE SIZES

THE CLEVELAND TOOL & SUPPLY CO.

1427-1437 W. Sixth Street

CLEVELAND, OHIO

HOLLOW BORED SPINDLES

Machine tools must have good spindles. That is why leading machine tool builders use American Hollow Bored products. Write for prices on American Hollow Bored spindles, shafts, rams and hydraulic cylinders.

AMERICAN HOLLOW BORING CO.

1912 RASPBERRY ST.

ERIE, PA.

Products Index

ECONOMIZERS

Babcock & Wilcox Co., The, 85 Liberty St., New York City.

ELECTRIC HEATING ELEMENTS

Global Div., The Carborundum Co., Niagara Falls, N. Y.

ELECTRIC LIGHTING

General Electric Co., Cleveland.
General Electric Vapor Lamp Co., Hoboken, N. J.

ELECTRIC WELDING—See Welding—

ELECTRICAL EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee.
General Electric Co., Schenectady, N. Y.

ELECTRICAL MACHINERY—Second

Hand. (See Clearing House Section)

ELECTRICAL WIRES

Roebbing's, John A., Sons Co., Trenton, N. J.

ELECTRODES—Welding, Coated

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Lincoln Electric Co., The, Cleveland.

Maurath, Inc., 7409 Union Ave., Cleveland.

Metal & Thermit Corp., 120 B'way, N. Y. C.

Una Welding, Inc., Cleveland, Ohio.

ELECTROPLATING EQUIPMENT & SUPPLIES

Baker Co., The, Chicago.

Udyrite Co., The, Detroit.

ELEVATORS—Steam Hydraulic

Ridgway, Craig, & Son Co., Coatesville, Pa.

EMERY WHEELS—See Grinding Wheels

ENAMEL

Larkin Co., Inc., Buffalo, N. Y.

Roxalin Flexible Lacquer Co., Inc., Elizabeth, New Jersey.

Sherwin-Williams Co., Cleveland.

ENGINEERS & CONTRACTORS

Ferguson, H. K. Co., The, Cleveland.

Engineers—Consulting and Industrial Koppers Co., Pittsburgh.

ENGINES—Gas

Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.

Fairbanks, Morse & Co., Chicago.

ENGINES—Oil

Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.

Ingersoll-Rand Co., 11 Broadway, New York City.

EYELET MACHINES

Manville, E. J., Mch. Co., Waterbury, Ct.

Waterbury (Conn.) Farrel Foundry & Machine Co.

FACING CLAY

Carborundum Co., The, Perth Amboy, N.J.

FACTORY & PLANT SITES

Zoll, Edward H., 196 Market St., Newark, N. J.

FANS—Cooling

Perkins, B. F. & Son, Inc., Holyoke, Mass.

FANS—Ventilating

American Blower Corp., 6000 Russell St., Detroit.

Bendix Products Corp., 413 Bendix Drive, South Bend, Ind.

Clarage Fan Co., Kalamazoo, Mich.

DeVilbiss Co., The, Toledo, Ohio.

FEED WATER HEATERS AND PURIFIERS

Harrisburg (Pa.) Steel Corp.

FEEDS—Hydraulic, for Machines

American Engineering Co., Philadelphia.

Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

FELT—Wool Mechanical

American Felt Co., 315 Fourth Ave., N.Y.C.

FENCING—Wire

Pittsburgh (Pa.) Steel Co.

FERROALLOYS

Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

Metal & Thermit Corp., 120 B'way, N.Y.C.

Ohio Ferro-Alloys Corp., Canton, Ohio.

Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.

Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROCHROME

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

Metal & Thermit Corp., 120 Broadway, N. Y. C.

Ohio Ferro-Alloys Corp., Canton, Ohio.

Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.

Samuel, Frank & Co., Inc., Philadelphia.

FERROMOLYBDENUM

Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICO MANGANESE

Ohio Ferro-Alloys Corp., Canton, Ohio.

Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICON

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

Ohio Ferro-Alloys Corp., Canton, Ohio.

Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.

Samuel, Frank & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICON ALUMINUM

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSPIEGELEISEN

New Jersey Zinc Co., The, 160 Front St., N. Y. C.

FERROTITANIUM

Metal & Thermit Corp., 120 Broadway, N. Y. C.

Titanium Alloys Mfg. Co., The, Niagara Falls, N. Y.

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROTUNGSTEN

Metal & Thermit Corp., 120 B'way, N. Y. C.

FERROVANADIUM

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

Metal & Thermit Corp., 120 B'way, N. Y. C.

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FILES & RASPS

Diaton, Henry & Sons, Inc., Philadelphia.

Nicholson File Co., Providence, R. I.

FILING MACHINES

Continental Machine Specialties, Inc., Minneapolis, Minn.

FILTERS—Oil

National Acme Co., The, Cleveland.

FILTERS—Pressure or Gravity

Scalfie, Wm. B. & Sons Co., Pittsburgh.

FIRE BRICK—Insulating

Babcock & Wilcox Co., The, 85 Liberty St., New York City.

Quigley Co., Inc., 56 West 45th St., N. Y. C.

FIRE CLAY

Carborundum Co., The, Perth Amboy, N. J.

Illinois Clay Products Co., Joliet, Ill.

Fittings—Brass, Pine and Tube Commonwealth Brass Corp., Detroit.

Fittings—Cast Iron—Rubber Lined American Hard Rubber Co., 11 Mercer St., N. Y. C.

FLANGES—Forged Steel

Harrisburg (Pa.) Steel Corp.

Standard Steel Wks. Co., Burnham, Pa.

FLANGING WORK—Carbon and Alloy

Worth Steel Co., Claymont, Del.

FLEXIBLE SHAFT EQUIPMENT

Lovejoy Flexible Coupling Co., Chicago.

Strand, N. A. & Co., Chicago.

FLOODLIGHTS—Acetylene

Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

FLOOR ARMORING

Acme Steel Co., Chicago, Ill.

FLOOR (CONCRETE) REPAIR MATERIALS

Flexrock Co., 892 N. Delaware Ave., Phila., Pa.

FLOOR PLATES—See Plates—Floor or

Cellar Door

FLOORING—Acid Proof

Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

FLOORING—Cast Iron, Unit

Interlake Iron Corp., Chicago.

FLOORING—Open Steel

Hendrick Mfg. Co., Carbondale, Pa.

FLOORING—Steel

American Pressed Steel Co., Phila., Pa.

FLUX—Welding

Linde Air Prods. Co., The, 30 E. 42nd St., N. Y. C.

FORGING MACHINES—Upset

Acme Machinery Co., Cleveland.

FORGINGS—Alloy Steel

Heppenstall Co., Pittsburgh.

National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Aluminum

Aluminum Co. of America, Pittsburgh.

FORGINGS—Brass, Bronze or Copper

American Brass Co., The, Watertown, Conn.

Commonwealth Brass Corp., Detroit.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

Transue & Williams Steel Forging Corp., Alliance, Ohio.

FORGINGS—Coin Pressed

Rockford (Ill.) Drop Forge Co.

FORGINGS—Drop, Iron or Steel

Atlas Drop Forge Co., Lansing, Mich.

Canton (Ohio) Drop Forging & Mfg. Co.

Carnegie-Illinois Steel C-rp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Hartford (Conn.) Drop Forge Co., The.

Oliver Iron & Steel Corp., Pittsburgh.

Poor & Co., Canton Forge & Axle Wks., Canton, Ohio.

Rockford (Ill.) Iron Forge Co.

Storms Drop Forging Co., Springfield, Mass.

Transue & Williams Steel Forging Corp., Alliance, Ohio.

Williams, J. H. & Co., Buffalo, N. Y.

FORGINGS—Hollow

Harrisburg (Pa.) Steel Corp.

National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Hollow Bored

American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

FORGINGS—Hydraulic Press, Iron or Steel

Atlas Drop Forge Co., Lansing, Mich.

Bethlehem (Pa.) Steel Company.

Mesta Mch. Co., Pittsburgh.

Middle Co., The, Nicetown, Phila., Pa.

National Forge & Ordnance Co., Irvine, Pa.

Standard Steel Wks. Co., Burnham, Pa.

FORGINGS—Manganese Alloys

Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

Products Index

FORGINGS—Upset
Bethlehem (Pa.) Steel Company.
Rockford (Ill.) Drop Forge Co.

FORMING MACHINES—Roll
Kane & Roach, Inc., Syracuse, New York.

FOUNDRY EQUIPMENT & SUPPLIES
Jeffrey Mfg. Co., The, Columbus, Ohio.

FUME DUCTS—Rubber Lined
Whiting Corp., Harvey, Ill.

AMERICAN HARD RUBBER CO., 11 Mercer St., N. Y. C.

FURNACE ENGINEERS
Electric Furnace Co., The, Salem, Ohio.
Flinn & Dreffeln Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Annealing & Case Hardening
American Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.

Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Billet or Ingot Heating
Flinn & Dreffeln Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Electric, Steel Melting
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
General Electric Co., Schenectady, N. Y.
Pittsburgh (Pa.) Leclonell Furnace Corp.

FURNACES—Enameling
Carborundum Co., The, Perth Amboy, N. J.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Forging
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Maehler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Heat Treating, Automatic
Amer. Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.

Rockwell, W. S. Co., 50 Church St., N. Y. C.

Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Heat Treating, Cyanide of Lead
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Heat Treating, Electric
Electric Furnace Co., The, Salem, Ohio.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., Detroit.

Hoskins Mfg. Co., Detroit, Mich.

Leeds & Northrup Co., Philadelphia.

Maehler, Paul Co., The, Chicago.

Rockwell, W. S. Co., 50 Church St., N. Y. C.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FURNACES—Heat Treating, Oil or Gas
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.

Maehler, Paul Co., The, Chicago.

Rockwell, W. S. Co., 50 Church St., N. Y. C.

Surface Combustion Corp., 2375 Dorr St., Toledo.

Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Pack Heating Sheets
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Wean Engineering Co., Inc., The, Warren, Ohio.

FURNACES—Rivet Heating, Electric
General Electric Co., Schenectady, N. Y.

FURNACES—Wire, Annealing and Galvanizing
General Electric Co., Schenectady, N. Y.
Surface Combustion Corp., 2375 Dorr St., Toledo.

GAGE BLOCKS
Ford Motor Co. (Johansson Division), Dearborn, Mich.

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

GAGES—Dial
Starrett, L. S. Co., Athol, Mass.

GAGES—Electric
Sheffield Gage Corp., The, Dayton, Ohio.

GAGES—Plug and Snap
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

Sheffield Gage Corp., The, Dayton, Ohio.

Taft-Peire Mfg. Co., The, Woonsocket, R. I.

GAGES—Pressure and Vacuum, Recording
Bristol Co., The, Waterbury, Conn.

Brown Instrument Co., Philadelphia.

GAGES—Thickness, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

GAGES—Thread Lead
Jones & Lamson Mch. Co., Springfield, Vt.

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

Sheffield Gage Corp., The, Dayton, Ohio.

GALVANIZING
American Hot Dip Galvanizers Assn., Inc., Pittsburgh.

Castle, Joseph P. & Bros., Phila.

GALVANIZING—Electro
Meaker Co., The, Chicago.

GALVANIZING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

GALVANIZING EQUIPMENT—Electro
Meaker Co., The, Chicago.

GALVANIZING EQUIPMENT—Electro—For Strip
Meaker Co., The, Chicago.

GALVANIZING EQUIPMENT—Electro—For Wire
Meaker Co., The, Chicago.

GALVANIZING PLANTS—For Sheets
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

ERIE (Pa.) Foundry Co.

GAS FOR INDUSTRIAL USES
American Gas Association, 420 Lexington Ave., N. Y. C.

GAS PRODUCERS
Flinn & Dreffeln Co., Chicago.
Koppers Co., Pittsburgh.

Morgan Construction Co., Worcester, Mass.

Wood, B. D., & Co., Philadelphia.

GAS RECOVERY COKE OVENS
Koppers Co., Pittsburgh.

GASKETS—Asbestos, Metal or Rubber
Garlock Packing Co., The, Palmyra, N. Y.

GASKETS—Rubber
American Hard Rubber Co., 11 Mercer St., N. Y. C.

Goodrich, B. F. Co., The, Akron, Ohio.

GEAR CHECKING EQUIPMENT
Michigan Tool Co., Detroit, Mich.

GEAR CUTTING
Earle Gear & Machine Co., Phila.

Farrel-Birmingham Co., Inc., Buffalo, N. Y.

Gleason Works, Rochester, N. Y.

James, D. O., Mfg. Co., Chicago.

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

Philadelphia (Pa.) Gear Works.

Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

GEAR CUTTING MACHINES
Brown & Sharpe Mfg. Co., Prov., R. I.

Farrel-Birmingham Co., Inc., Buffalo, N. Y.

Gleason Works, Rochester, N. Y.

GEAR DRIVES—Herringbone
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

Lewis Foundry & Mch. Co., Pittsburgh.

United Engineering & Fdry. Co., Pith.

GEAR LAPPING MACHINES
Michigan Tool Co., Detroit, Mich.

GEARMOTORS
Allis-Chalmers Mfg. Co., Milwaukee.

James, D. O., Mfg. Co., Chicago.

Reliance Electric & Engng. Co., Cleveland.

Westinghouse Elec. & Mfg. Co., East Pith.

GEAR PLANNING MACHINES
Gleason Works, Rochester, N. Y.

GEAR SHAVING MACHINES
Michigan Tool Co., Detroit, Mich.

GEARS—Bevel
Boston Gear Wks., Inc., North Quincy, Mass.

Gleason Works, Rochester, N. Y.

James, D. O., Mfg. Co., Chicago.

Richardson Co., The, Melrose Park, Ill.

GEARS—Heat Treated
Gleason Works, Rochester, N. Y.

James, D. O., Mfg. Co., Chicago.

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

Simonds Mfg. Co., Pittsburgh.

GEARS—Herringbone
Farrel-Birmingham Co., Inc., Buffalo, N. Y.

Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.

James, D. O., Mfg. Co., Chicago.

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

Mehta Mch. Co., Pittsburgh.

Philadelphia (Pa.) Gear Works.

GEARS—Machine Cut
Boston Gear Wks., Inc., North Quincy, Mass.

Cleveland (Ohio) Worm & Gear Co.

Foots Gear Wks., Inc., 1315 S. Cleora Ave., Cicero, Ill.

Gleason Works, Rochester, N. Y.

James, D. O., Mfg. Co., Chicago.

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

Simonds Mfg. Co., Pittsburgh.

GEARS—Non-Metallic
Boston Gear Wks., Inc., North Quincy, Mass.

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

General Electric Co., Schenectady, N. Y.

James, D. O., Mfg. Co., Chicago.

GEARS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

GEARS—Steel, Silent
Waldron, John, Corp., New Brunswick, N. J.

GEARS—Spur
Boston Gear Wks., Inc., North Quincy, Mass.

James, D. O., Mfg. Co., Chicago.

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

Philadelphia (Pa.) Gear Works.

Simonds Mfg. Co., Pittsburgh.

GEARS—Worm
Boston Gear Wks., Inc., North Quincy, Mass.

Cleveland (Ohio) Worm & Gear Co.

Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.

James, D. O., Mfg. Co., Chicago.

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

Philadelphia (Pa.) Gear Works.

GENERATORS—Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

GENERATORS—Electric
Fairbanks, Morse & Co., Chicago.

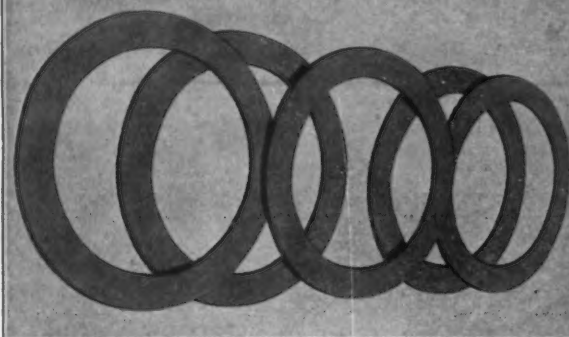
Lincoln Electric Co., The, Cleveland.

Reliance Electric & Engng. Co., Cleveland.

Westinghouse Elec. & Mfg. Co., East Pith.

GENERATORS—Electric, Second Hand.
(See Clearing House Section)

GENERATORS—Electroplating
Meaker Co., The, Chicago.



FLANGES OR FLAT RINGS FOR ALL PURPOSES
THE AMERICAN WELDING & MFG. CO., Warren, Ohio

STEEL FORGINGS

UPSET, DROP and COIN PRESSED
ANY ANALYSIS—ANY QUANTITY

Send us your blue prints for prices

ROCKFORD DROP FORGE CO.

2030 9th St.
ROCKFORD, ILL.

DROP FORGINGS

LIGHT AND MEDIUM WEIGHT

also DROP FORGING AND TRIMMING DIES

MADE TO ORDER

THE HARTFORD DROP FORGE CO., HARTFORD, CONN.

POOR AND COMPANY

Any
Size

FORGINGS

Any
Specification

CANTON FORGE & AXLE WORKS
2025 DUEBER AVE., S. W., CANTON, OHIO

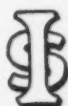
From
a Pound
to a Ton

ELECTRIC

Inquiries
Solicited

STEEL CASTINGS

CRUCIBLE STEEL CASTINGS COMPANY
LANSDOWNE, DELAWARE COUNTY, PENNSYLVANIA
(Near Philadelphia)



There is a
Toledo Alloy Steel
for every need



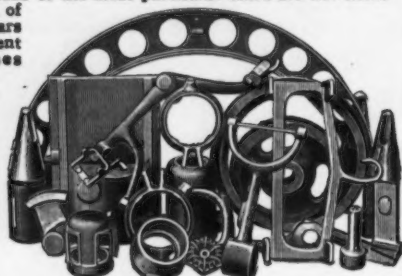
THE INDUSTRIAL STEEL CASTING CO.
Toledo, Ohio

GOOD Castings—

that meet the specifications of the most particular users are not made by any combination of good luck. But 63 years of experience, development of equipment, processes and personnel, have put this company in a position to supply castings of uniform excellence in any quantity and to any specifications.



MALLEABLE IRON FITTINGS CO.
BRANFORD, CONN.



MANUFACTURERS OF

GRAY IRON SPECIALTIES

Completely Finished Articles of Gray Iron

S. CHENEY & SON

GRAY IRON FOUNDERS

MANLIUS, N. Y.



HEAVY — MEDIUM

STAMPINGS

SEND SAMPLES OR BLUE PRINTS FOR ESTIMATES

LANSING STAMPING CO.
SO. PENN. AVE. LANSING, MICHIGAN

SHEET METAL WORK.

*Small orders solicited
as well as
quantity production*

Our facilities consist of shearing and forming equipment up to 10' and 3/16"; large number of presses, spot welders, oxy-acetylene and arc welders.

Send us drawing or samples for prices.

CHAMPION SHEET METAL CO., Inc.

COR. SQUIRES AND DUANE STS.

CORTLAND, NEW YORK

STAMPED METAL PARTS



QUALITY
STAMPINGS

for every industry

We have had many years of Light and Heavy Stamping Experience. We offer you the benefit of our knowledge and equipment.

WORCESTER STAMPED METAL CO.

Established 1883

WORCESTER, MASS.

Products Index

GLOVES—Asbestos & Fireproof
Safety Equipment Service Co., The, Cleve.
GOGGLES—Safety
American Optical Co., Southbridge, Mass.
Safety Equipment Service Co., The, Cleve.
GOVERNORS—Air Compressor
Westinghouse Air Brake Co., Industrial
Div., Pittsburgh.
GRATING—Flooring, Sidewalk, etc.—See
Flooring—Open Steel
GREASE—Lubricating
Gulf Oil Corp., Gulf Refining Co., Pitts-
burgh.
Penola, Inc., Pittsburgh.
Shell's Industrial Lubricants Div., Shell
Bldg., San Francisco, Shell Bldg.,
St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 28 Broad-
way, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery
Place, N. Y. C.
GRILLES—Metal Cane
Diamond Mfg. Co., Wyoming, Pa.
GRILLES—Perforated Metal
Erdie Perforating Co., Rochester, N. Y.
Harrington & King Perforated Co., Chi-
cago.
**GRINDING AND POLISHING MA-
CHINES**
Excelsior Tool & Mch. Co., E. Et. Louis, Ill.
Norton Co., Worcester, Mass.
Vonnegut Moulder Corp., 1807 Madison
Ave., Indianapolis, Ind.
GRINDING MACHINES—Centerless
Cincinnati (Ohio) Grinders Incorporated.
GRINDING MACHINES—Chucking
Bryant Chucking Grinder Co., Springfield,
Vt.
GRINDING MACHINES—Cutter &
Reamer
Cincinnati (Ohio) Milling Mch. Co., The,
Gallmeyer & Livingston Co., Grand
Rapids, Mich.
Landis Tool Co., Waynesboro, Pa.
GRINDING MACHINES—Cylinder
Heald Mch. Co., Worcester, Mass.
GRINDING MACHINES—Cylindrical
Brown & Sharpe Mfg. Co., Providence, R.I.
Cincinnati (Ohio) Grinders Incorporated.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.
GRINDING MACHINES—Die
Landis Mch. Co., Inc., Waynesboro, Pa.
GRINDING MACHINES—Drill
Gallmeyer & Livingston Co., Grand
Rapids, Mich.
GRINDING MACHINES—Gear & Worm
Pratt & Whitney Div. Niles-Bement-Pond
Co., Hartford, Conn.
GRINDING MACHINES—Internal
Bryant Chucking Grinder Co., Springfield,
Vt.
Greenfield (Mass.) Tap & Die Corp.
Heald Mch. Co., Worcester, Mass.
GRINDING MACHINES—Internal Cen-
terless
Heald Mch. Co., Worcester, Mass.
GRINDING MACHINES—Internal Multi-
ple Spindle
Heald Mch. Co., The, Bridgeport, Conn.
GRINDING MACHINES—Portable Elec-
tric
Chicago Pneumatic Tool Co., 6 East 44th
St., N. Y. C.
Wodack Electrical Tool Corp., Chicago.
GRINDING MACHINES—Portable Flexi-
ble
Pratt & Whitney Div. Niles-Bement-Pond
Co., Hartford, Conn.
Strand, N. A. & Co., Chicago.
GRINDING MACHINES—Portable Pneu-
matic
Buckeye Portable Tool Co., The, Dayton, O.
Chicago Pneumatic Tool Co., 6 East 44th
St., N. Y. C.
Ingersoll-Rand Co., 11 Broadway, New
York City.
Warner & Swasey Co., The, Cleveland.
GRINDING MACHINES—Roll
Cincinnati (Ohio) Grinders Incorporated.
Farrel-Birmingham Co., Inc., Ansonia,
Conn.
Landis Tool Co., Waynesboro, Pa.
GRINDING MACHINES—Snagging
Vonnegut Moulder Corp., 1807 Madison
Ave., Indianapolis, Ind.
Warner & Swasey Co., The, Cleveland.
GRINDING MACHINES—Surface
Blanchard Machine Co., The, Cambridge,
Mass.
Gallmeyer & Livingston Co., Grand
Rapids, Mich.
Heald Mch. Co., Worcester, Mass.
Norton Co., Worcester, Mass.
Pratt & Whitney Div. Niles-Bement-Pond
Co., Hartford, Conn.
GRINDING MACHINES—Swing Frame
Vonnegut Moulder Corp., 1807 Madison
Ave., Indianapolis, Ind.
GRINDING MACHINES—Tap
Gallmeyer & Livingston Co., Grand
Rapids, Mich.
GRINDING MACHINES—Tool
Cincinnati (Ohio) Milling Mch. Co., The,
Gisbott Machine Co., Madison, Wis.
Landis Tool Co., Waynesboro, Pa.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Norton Co., Worcester, Mass.
GRINDING MACHINES—Universal
Cincinnati (Ohio) Grinders Incorporated.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.
GRINDING MACHINES—Valve
Landis Tool Co., Waynesboro, Pa.
GRINDING WHEELS
Bakelite Corp., 247 Park Ave., N. Y. C.
Blanchard Machine Co., The, Cambridge,
Mass.
Carborundum Co., The, Niagara Falls, N. Y.

MacKlin Co., Jackson, Mich.
Manhattan Rubber Mfg. Div. of Ray-
bestos-Manhattan, Inc., The, 2 Town-
send St., Passaic, N. J.
Norton Co., Worcester, Mass.
GRINDING WHEELS—Segment
Blanchard Machine Co., The, Cambridge,
Mass.
GRIT—Steel
Pittsburgh (Pa.) Crushed Steel Co.
HACK SAW BLADES—See Saws—Hack
Saw Blades
HACK SAW MACHINES
Armstrong-Blum Mfg. Co., Chicago.
Gallmeyer & Livingston Co., Grand Rapids,
Mich.
Peerless Mch. Co., Racine, Wis.
HAMMERS—Drop
Biliss, E. W., Co., Toledo, Ohio.
Chambersburg (Pa.) Engineering Co.
Erle (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.
Standard Machinery Co., Providence, R. I.
HAMMERS—Helve
Bradley, C. C., & Son, Inc., Syracuse,
N. Y.
HAMMERS—Pneumatic
Chicago Pneumatic Tool Co., 6 East 44th
St., N. Y. C.
Ingersoll-Rand Co., 11 Broadway, New
York City.
HAMMERS—Portable Electric
Wodack Electrical Tool Corp., Chicago.
HAMMERS—Power
Bradley, C. C., & Son, Inc., Syracuse,
N. Y.
Chambersburg (Pa.) Engineering Co.
HAMMERS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., 1306
Elson Ave.
HAMMERS—Steam
Chambersburg (Pa.) Engineering Co.
Erle (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.
HANGERS—Ball Bearing
S K B Industries, Inc., Front St. & Erie
Ave., Phila., Pa.
HANGERS—Roller Bearing
Hyatt Bearings Div., General Motors Corp.,
Newark, N. J.
HARDNESS TESTING MACHINES
Shore Instrument & Mfg. Co., The, Jam-
maica, L. I.
HEADING MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Ma-
chine Co.
HEADS—Spun and Pressed
Central Iron & Steel Co., Harrisburg, Pa.
Worth Steel Co., Claymont, Del.
HEADS—Steel—Flanged and Dished
Central Iron & Steel Co., Harrisburg, Pa.
HEAT RESISTING PRODUCTS—Electric
Global Div., The Carborundum Co.,
Niagara Falls, N. Y.
Holden, A. F. Co., New Haven, Conn.
HEAT TREATING
Barnes-Gibson-Raymond, Inc., Detroit.
Barnes, Wallace Co., The, Bristol, Conn.
General Machine Wks., York, Pa.
Gibson, Wm. D. Co., Chicago.
Holden, A. F. Co., New Haven, Conn.
Parish Pressed Steel Co., Reading, Pa.
HEAT TREATING COMPOUNDS
Holden, A. F. Co., New Haven, Conn.
Houghton, E. F., & Co., Philadelphia.
HEAT TREATING EQUIPMENT—Air
Draw
Holden, A. F. Co., New Haven, Conn.
Maehler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorr St.,
Toledo.
HEATING RESISTANCE—Non-Metallic
Global Div., The Carborundum Co.,
Niagara Falls, N. Y.
Holden, A. F. Co., New Haven, Conn.
HOISTS—Air
Chicago Pneumatic Tool Co., 6 East 44th
St., N. Y. C.
Detroit (Mich.) Hoist & Mach. Co.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Northern Engineering Works, Detroit.
Ridgway, Craig & Son Co., Coatesville, Pa.
HOISTS—Chain
Wright Mfg. Div., American Chain &
Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div.,
Phila., Pa.
HOISTS—Electric
American Engineering Co., Philadelphia.
Detroit (Mich.) Hoist & Mach. Co.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National
Ave., Milwaukee, Wis.
Northern Engineering Works, Detroit,
Mich.
Philadelphia (Pa.) Gear Works.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Co., Inc., 402
Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Mon-
teur Falls, N. Y.
Wright Mfg. Div., American Chain &
Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div.,
Phila., Pa.
HOISTS—Electric Traveling
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland
Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Co., Inc., 402
Broadway, Muskegon, Mich.
HOISTS—Monorail
Cleveland Tramrail Div. of The Cleveland
Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Co., Inc., 402
Broadway, Muskegon, Mich.

Products Index

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
HOISTS—Screw
 Sullivan Machinery Co., Claremont, N. H.
HOSE—Flexible Metallic
 American Brass Co., The, Waterbury, Conn.
HOSE—Rubber
 Goodrich, B. F. Co., The, Akron, Ohio.
 Goodyear Tire & Rubber Co., Akron, Ohio.
 Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
HYDRANTS—Fire
 Wood, H. D., & Co., Philadelphia.
HYDRAULIC FEEDS
 Vickers, Inc., 1420 Oakman Blvd., Detroit, Mich.
HYDRAULIC MACHINERY
 Baldwin-Southwark Corp., Southwark Div., Philadelphia.
 Chambersburg (Pa.) Engineering Co.
 Elmer, Chas. F., Engle, Wks., Chicago.
 Farquhar, A. B. Co., Ltd., York, Pa.
 Lake Erie Engineering Corp., 68 Kenmore St., Buffalo, N. Y.
 Morgan Engineering Co., The, Alliance, O.
 Wood, H. D., & Co., Philadelphia.
INGOT MOLDS
 Shenango Furnace Co., Pittsburgh.
 Shenango-Penn Mold Co., Pittsburgh.
 Snyder, W. P., & Co., Pittsburgh.
 Valley Mold & Iron Corp., Hubbard, Ohio.
INGOTS—Aluminum
 Aluminum Co. of America, Pittsburgh.
 Sellman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.
INGOTS—Phosphor Bronze
 Phosphor Bronze Smelting Co., The, Phila.
INHIBITORS
 American Chemical Paint Co., Ambler, Pa.
 Du Pont de Nemours, E. I., & Co., Inc.
 Grasselli Chemicals Dept., Wilmington, Del.
INSTRUMENTS—Recording
 Bristol Co., The, Waterbury, Conn.
 Brown Instrument Co., Philadelphia.
 Leeds & Northrup Co., Philadelphia.
IRON—Genuine Open Hearth Iron
 Newport (Ky.) Rolling Mill Co., The.
IRON—Rustless
 Ludlum Steel Co., Watervliet, N. Y.
JIGS, FIXTURES, DIES, etc. (See Dies, Jigs, Fixtures, etc.)
KEYS—Riveted
 Western Wire Prods. Co., St. Louis, Mo.
KEYSEATING MACHINES
 Baker Bros., Inc., Toledo, Ohio.
 Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.
LACING—Belt, Rawhide or Leather
 Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
LACQUER
 Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.
 Sherwin-Williams Co., Cleveland.
LAGGING—Insulating
 Quigley Co., Inc., 56 West 45th St., N. Y. C.
LAMPS—Fluorescent
 General Electric Co., Cleveland.
LAMPS—Mercury Vapor
 General Electric Vapor Lamp Co., Hoboken, N. J.
LAPPING MACHINES
 Cincinnati (Ohio) Grinders Incorporated.
LATHES—Automatic
 Baird Mch. Co., The, Bridgeport, Conn.
 Bullard Co., The, Bridgeport, Conn.
 Gisholt Machine Co., Madison, Wis.
 Goss & De Leeuw Mch. Co., The, New Britain, Conn.
 Jones & Lamson Mch. Co., Springfield, Vt.
 LeBlond, R. K. Mch. Tool Co., Cincinnati.
 Monarch Mch. Tool Co., The, Sidney, O.
LATHES—Automatic Vertical
 Baird Mch. Co., The, Bridgeport, Conn.
 Bullard Co., The, Bridgeport, Conn.
 Gisholt Machine Co., Madison, Wis.
LATHES—Bench
 Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
 Rivett Lathe & Grinder, Inc., Boston, Mass.
 South Bend (Ind.) Lathe Works, 595 E. Madison St.
LATHES—Brass
 Warner & Swasey Co., The, Cleveland.
LATHES—Chucking
 Jones & Lamson Mch. Co., Springfield, Vt.
 Warner & Swasey Co., The, Cleveland.
LATHES—Contour Turning
 Monarch Mch. Tool Co., The, Sidney, O.
LATHES—Cranks
 LeBlond, R. K. Mch. Tool Co., Cincinnati.
LATHES—Engine
 Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
 LeBlond, R. K. Mch. Tool Co., Cincinnati.
 Monarch Mch. Tool Co., The, Sidney, O.
 Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
 South Bend (Ind.) Lathe Works, 595 E. Madison St.
LATHES—Roll
 Lewis Foundry & Mch. Co., Pittsburgh.
 Mesta Mch. Co., Pittsburgh.
 United Engineering & Fdry. Co., Pgh.
LATHES—Second-Hand. (See Clearing House Section)
LATHES—Toolroom
 Monarch Mch. Tool Co., The, Sidney, O.
 Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
 South Bend (Ind.) Lathe Works, 595 E. Madison St.
LATHES—Turret
 Acme Machine Tool Co., Cincinnati.
 Bardons & Oliver, Cleveland.
 Bullard Co., The, Bridgeport, Conn.
 Gisholt Machine Co., Madison, Wis.
 Jones & Lamson Mch. Co., Springfield, Vt.
 Warner & Swasey Co., The, Cleveland.

LATHES, Turret, Vertical
 Bullard Co., The, Bridgeport, Conn.
LEAD in Oil
 Sherwin-Williams Co., Cleveland.
LEATHER—Cup
 Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
LEGGINGS—Safety
 Safety Equipment Service Co., The, Clev.
LEVELING MACHINES
 Aetna-Standard Engineering Co., The, Youngstown, Ohio.
 Wean Engineering Co., Inc., The, Warren, O.
 Schatz Mfg. Co., The, Poughkeepsie, N. Y.
LOCK WASHER MACHINERY
 Stearns & Hartley, Inc., Worcester, Mass.
LOCOMOTIVES—Electric
 Atlas Car & Mfg. Co., The, Cleveland.
 General Electric Co., Schenectady, N. Y.
LOCOMOTIVES—Gasoline
 Plymouth (Ohio) Locomotive Wks.
LOCOMOTIVES—Industrial
 Jeffrey Mfg. Co., The, Columbus, Ohio.
 Plymouth (Ohio) Locomotive Wks.
LOCOMOTIVES—Storage Battery
 Atlas Car & Mfg. Co., The, Cleveland.
LUBRICANTS—Crusher & Grinding
 Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
 Penola, Inc., Pittsburgh.
 Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
 Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
 Sun Oil Co., Philadelphia.
 Texas Company, The, 135 East 42nd St., N. Y. C.
 Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
LUBRICANTS—Gear
 Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
 Penola, Inc., Pittsburgh.
 Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
 Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
 Standard Oil Co. (Indiana), Chicago.
 Sun Oil Co., Philadelphia.
 Texas Company, The, 135 East 42nd St., N. Y. C.
 Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
LUBRICANTS—High Pressure & Temperature
 Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
 Penola, Inc., Pittsburgh.
 Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
 Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
 Standard Oil Co. (Indiana), Chicago.
 Sun Oil Co., Philadelphia.
 Texas Company, The, 135 East 42nd St., N. Y. C.
 Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
LUBRICANTS—Mine Cars
 Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
 Penola, Inc., Pittsburgh.
 Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
 Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
 Sun Oil Co., Philadelphia.
 Texas Company, The, 135 East 42nd St., N. Y. C.
 Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
LUBRICANTS—Mining Machines
 Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
 Penola, Inc., Pittsburgh.
 Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
 Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
 Sun Oil Co., Philadelphia.
 Texas Company, The, 135 East 42nd St., N. Y. C.
 Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
LUBRICANTS—Railroad
 Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
 Penola, Inc., Pittsburgh.
 Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
 Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
 Sun Oil Co., Philadelphia.
 Texas Company, The, 135 East 42nd St., N. Y. C.
 Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
LUBRICANTS—Roll Neck—Anti-Friction & Plain
 Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
 Penola, Inc., Pittsburgh.
 Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
 Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
 Standard Oil Co. (Indiana), Chicago.
 Sun Oil Co., Philadelphia.
 Texas Company, The, 135 East 42nd St., N. Y. C.
 Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
LUBRICANTS—Tippie & Cleaning
 Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Our Specialty STAMPINGS

FOR EVERY PRODUCT

Your Inquiries Solicited



SHEET METAL SPECIALTY CO. PITTSBURGH, PA.



Hayward Buckets

Use this Electric Motor Clam Shell for reclaiming material as required.
 THE HAYWARD CO., 46-50 Church St., N. Y.

ELEVATORS

Steam Hydraulic

The Ridgway Steam Hydraulic Elevator is PERFECTION for the man who has steam or air available.

Hundreds in use in Biggest Plants

"HOOK 'ER TO THE BILER!"

CRAIG RIDGWAY & SON CO., COATESVILLE, PA.

**LOCOMOTIVE CRANES
CRAWLER CRANES
SHOVELS**

THE OHIO LOCOMOTIVE CRANE CO.
CINCINNATI, OHIO

CRANES

All Types
 Foundry Equipment
 Special Machinery
 Evaporation
 Chemical Machinery
 Pulverized Coal
 Equipment
 Stokers

WHITING CORPORATION

HARVEY-ILL. U.S.A.
 (CHICAGO SUBURB)

Ponco

OVERHEAD TRAVELING CRANES

Specializing for twenty years in building Overhead Cranes (capacities to 25 tons), Hand and Electric Hoists, and Beam Trolleys.

CONCO ENGINEERING WORKS

Division of H. D. Conkey & Company

MENDOTA, ILLINOIS

GIVE PROFIT A LIFT

With the Canton Portable Crane. It saves the time of your men and it saves the expense of using large cranes for the smaller lifting jobs. Built in 8 sizes with friction load brake. Interested in a 30-day free trial?

Also manufacturers of alligator shears and industrial turntables.

CANTON FOUNDRY & MACHINE CO.

6400 Breakwater Ave.

Cleveland, Ohio



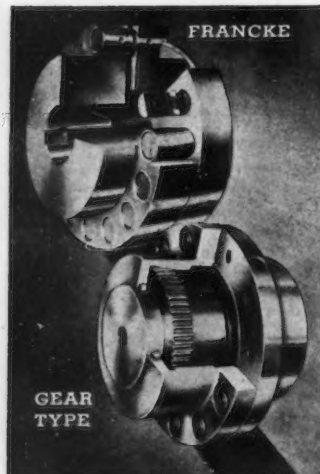
DETROIT HOIST & MACHINE CO.

**ELECTRIC and PNEUMATIC
CAPACITIES 1/4 to 10 TONS**

DETROIT HOIST & MACHINE CO.

ROBBINS & MYERS
INC.
SPRINGFIELD, OHIO
ELECTRIC and HAND
HOISTS—CRANES

FOOTE GEARS
SPEED REDUCERS
worm . . . motorized . . . four-speed . . .
herringbone . . . flexible couplings.
CUT GEARS . . . ALL KINDS . . . EVERY PURPOSE.
Send for free 128 pg. data book
FOOTE GEAR WKS., INC. 1301-L. S. Cleare Ave.
Cleare Illinois



A Size and Type
For Every Purpose
FRANCKE-GEAR TYPE
FLEXIBLE
COUPLINGS

Steel Couplings that embody exclusive design features; provide utmost protection against shock loads and vibration. Low initial cost; trouble-free operation. Write for particulars.

JOHN WALDRON CORP.
NEW BRUNSWICK, N. J.

Need GEARS?
SEE SIMONDS
MAXIMUM SIZES
Spur Gears 145" Dia.
Bevel & Mitre Gears 60" Dia.
Worm Gears 72" Dia.
Worms 12" Dia.
Racks 10" Face, 1" D.P.
9" Face, 3/2" C.P.
Internal Gears 30" Dia., 4 D.P.
MATERIALS
Cast Iron
Cast Steel
Forged Steel
Non-Ferrous Metals
Rawhide
Bakelite
All-Steel Silent Pinions
SIMONDS
HEAT TREATED GEARS FOR SEVERE SERVICE
THE SIMONDS MANUFACTURING CO., PITTSBURGH PA

EARLE Cut Spur, Bevel, Herringbone and Worm Gears
All Sizes. Every Description Operating Machinery for Bridges, etc.
"Lee Simplex" Cold Metal Saws.
GEARS
The Earle Gear & Machine Co.
4715 Stanton Ave.
Philadelphia, Pa.
110 State St., Boston, Mass.
95 Liberty St., New York City

H. A. BRASSERT & CO.
CONSULTING ENGINEERS
for Iron, Steel,
Fuel and Heavy Metallurgical Industries.
PROJECTS, PLANT DESIGN
CONSTRUCTION, OPERATION
MARKETS, FINANCE
AND MANAGEMENT
310 South Michigan Ave. Chicago, Ill.

Products Index

Penola, Inc., Pittsburgh.
Shell Industrial Lubricants Div., Shell Bldg., San Francisco; Shell Bldg., St. Louis, and 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
MACHINE GUARD MATERIALS
Erdie Perforating Co., Rochester, N. Y.
MACHINE WORK
Farquhar, A. B., Co., Ltd., York, Pa.
General Machine Works, York, Pa.
Houde Engineering Corp., Buffalo, N. Y.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.
MACHINERY DEALERS—Second-Hand, (See Clearing House Section)
MACHINISTS' SMALL TOOLS
Starrett, L. S., Co., Athol, Mass.
MAGNESITE—Brick or Dead Burnt
Carborundum Co., The, Perth Amboy, N. J.
MAGNESIUM
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.
MAGNETS—Lifting
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleve. Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.
MALLETS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
MANGANESE METAL AND ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.
Metal & Thermit Corp., 120 B'way, N. Y. C.
MANHOLE FITTINGS AND SADDLES
Worth Steel Co., Claymont, Del.
MANIFOLDS—Oxygen & Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
MARKING MACHINES
Noble & Westbrook Mfg. Co., The, East Hartford, Conn.
METAL PARTS—Rubber Covered
American Hard Rubber Co., 11 Mercer St., N. Y. C.
METAL SPECIALTIES
Crosby Co., The, Buffalo, N. Y.
Toledo (Ohio) Stamping & Mfg. Co.
Torrington (Conn.) Company.
Tucson Steel Co., Pressed Steel Div., Cleveland.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.
Worcester (Mass.) Stamped Metal Co.
METERS—Flow
Brown Instrument Co., Philadelphia.
MICROMETERS
Starrett, L. S., Co., Athol, Mass.
MICROMETERS—Automatic, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.
MILLING MACHINES—Automatic
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.
MILLING MACHINES—Horizontal
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.
MILLING MACHINES—Planer Type
Cincinnati (Ohio) Planer Co.
MILLING MACHINES—Second-Hand, (See Clearing House Section)
MILLING MACHINES—Vertical
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.
MOLDING MACHINES
Tabor Mfg. Co., Phila., Pa.
MOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
MONEL METAL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.
MONORAIL SYSTEMS—Hand & Electric
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
MOTORS—Electric
Allis-Chalmers Mfg. Co., Milwaukee.
Century Electric Co., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., Cleveland.
Reliance Electric & Engineering Co., Cleveland.
Westinghouse Elec. & Mfg. Co., E. P'th.
MOTORS—Electric, Second-Hand, (See Clearing House Section)
NAILS—Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Wicktown (Ohio) Sheet & Tube Co., The.
NICKEL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.
NICKEL ANODES—Rolled or Cast
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.
NICKEL SILVER
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.
NITROGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
NOZZLES—Sand Blasting
Norton Co., Worcester, Mass.

NUMBERING MACHINES—For Metal
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.
NUT MACHINERY—Automatic Cold Pressed
Waterbury (Conn.) Farrel Foundry & Machine Co.
NUTS—Acorn
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
NUTS—Castellated
National Acme Co., The, Cleveland.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
NUTS—Cold Punched
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
NUTS—Hot Pressed
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
NUTS—Lock
Standard Pressed Steel Co., Jenkintown, Pa.
NUTS—Machine Screw
Blake & Johnson Co., The, Waterville, Ct.
NUTS—Semi-Finished
Cleveland (Ohio) Cap Screw Co., The.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
NUTS—Thumb Nailable
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
NUTS—Wing
Parker-Kalon Corp., 196 Varick St., N. Y. C.
OIL & GREASE SEALS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
OIL—Fuel, Low Sulphur
Bennett Oil Co., Inc., 366 Madison Ave., New York City.
OIL RETAINERS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
OIL STONES
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.
OILS—Cutting
Houghton, E. F., & Co., Philadelphia.
Penola, Inc., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, and 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
OILS—Fuel
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
OILS—Lubricating
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Houghton, E. F., & Co., Philadelphia.
Penola, Inc., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, and 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.
OILS—Soluble—See Oils—Cutting
ORES—Iron
Cleveland-Cliffs Iron Co., Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Shenango Furnace Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.
OVENS—Coke and By-Product Recovery
Koppers Co., Pittsburgh.
OVENS—Core and Mold
Herrington & Randall, Inc., Detroit.
Holcroft & Co., Detroit.
OVENS—Crucible
Koppers Co., Pittsburgh.
OVENS—Enameling and Japanning
Carborundum Co., The, Perth Amboy, N. J.
Herrington & Randall, Inc., Detroit.
Mahler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.
OXY-ACETYLENE—Shape-Cutting Machines
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
OXYGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
PACKING—Felt
American Felt Co., 315 Fourth Ave., N. Y. C.
PACKING—Hydraulic
Rhoads, J. E. & Sons, Philadelphia.

Products Index

PACKING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The,
1306 Elston Ave.
Rhoads, J. E., & Sons, Philadelphia.

PACKING—Metallic
Garlock Packing Co., The, Palmyra, N. Y.

PACKING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Ray-
bestos-Manhattan, Inc., The, 2 Townsend
St., Passaic, N. J.

PACKING—Sheet, Asbestos or Rubber
Garlock Packing Co., The, Palmyra, N. Y.

PAINT
Larkin Co., Inc., Buffalo, N. Y.
Sherwin-Williams Co., Cleveland.

PERFORATED METAL
Chicago Perforating Co., 2440 W 24th
Place, Chicago, Ill.

Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chl.
Hendrick Mfg. Co., Carbonale, Pa.
Mundt, Chas., & Sons, 59 Fairmount
Ave., Jersey City, N. J.
Wickwire Spencer Steel Co., 41 East 42nd
St., N. Y. C.

PHOSPHOR—Copper
Phosphor Bronze Smelting Co., The, Phila.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.

PICKLING MACHINES
Actna-Standard Engineering Co., The,
Youngstown, Ohio.
Meeker Co., The, Chicago.

PICKLING TANK LININGS
Celcote Co., The, Cleveland.

PICKLING TANK STEAM JETS
Durlon Co., Inc., The, 438 N. Findlay
St., Dayton, Ohio.

PIG IRON
Bethlehem (Pa.) Steel Co.

Brooke, E. & G., Iron Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., U. S. Steel
Corp. Subsidiary, Pittsburgh & Chi-
cago.

Cleveland-Cliffs Iron Co., Cleveland, Ohio.

Hanna Furnace Corp., The, Detroit, Mich.

Pickands Mather & Co., Cleveland.

Republic Steel Corp., Cleveland, Ohio.

Shenango Furnace Co., Pittsburgh.

Shenango-Penn Mold Co., Pittsburgh.

Superior Charcoal Iron Co., Grand Rapids,
Mich.

Tennessee Coal, Iron & Railroad Co.
(U. S. Steel Corp. Subsidiary), Birming-
ham, Ala.

PIG IRON—Charcoal
Superior Charcoal Iron Co., Grand Rapids,
Mich.

PILING—Steel Pipe
National Tube Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.

PILING—Steel Sheet
Carnegie-Illinois Steel Corp. (U. S. Steel
Corp. Subsidiary), Pittsburgh & Chi-
cago.

Jones & Laughlin Steel Corp., Pittsburgh.

PINIONS—Rolling Mill
Mesta Mch. Co., Pittsburgh.

PINIONS—Wire and Rod
Rathbone, A. R. & J., Palmer, Mass.

PIPE—Cast Iron, B. & S. and Flanged
Wood, R. D., Philadelphia.

PIPE—Hammer Welded
National Tube Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.

PIPE—New and Second-Hand
Albert & Davidson Pipe Corp., 2nd Ave.,
50-51st St., Bklyn., N. Y.

Albert Pipe Supply, Inc., Berry and
N. 13th St., Bklyn., N. Y.

Fisher Bros. Steel Corp., Morris Ave. and
130th St., Bronx.

Greenpoint Iron & Pipe Co., Inc., Stag
& Bogart Sts., Bklyn., N. Y.

PIPE—Seamless Brass or Copper
American Brass Co., The, Waterbury, Conn.

Revere Copper & Brass, Inc., 230 Park
Ave., N. Y. C.

PIPE—Spiral Welded
American Rolling Mill Co., Middletown, O.
Crane Co., Chicago.

PIPE—Standard, Black and Galvanized
Bethlehem (Pa.) Steel Co.

Jones & Laughlin Steel Corp., Pittsburgh.

National Tube Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.

Republic Steel Corp., Cleveland, Ohio.

Youngstown (Ohio) Sheet & Tube Co., The.

PIPE, Steel—Rubber Lined
American Hard Rubber Co., 11 Mercer
St., N. Y. C.

PIPE—Welded, Electric
National Tube Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.

Republic Steel Corp., Cleveland, Ohio.

PIPE FITTINGS
Crane Co., Chicago.

Jarecki Mfg. Co., Erie, Pa.

**PIPE THREADING & CUTTING MA-
CHINES**

Actna-Standard Engineering Co., The,
Youngstown, Ohio.

Curtis & Curtis Co., Bridgeport, Conn.

Jarecki Mfg. Co., Erie, Pa.

Landis, Mach. Co., Inc., Waynesboro, Pa.

Merrell Mfg. Co., Toledo.

Murphy Machine & Tool Co., Detroit.

Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PIPE—TUBE BENDING
Pittsburgh (Pa.) Piping & Equip. Co.

PLANERS
Cincinnati (Ohio) Planer Co.

PLANING MACHINES—Second Hand.
(See Clearing House Section)

PLASTICS—Laminated
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS—Laminated or Molded
Phenolic

Richardson Co., The, Melrose Park, Ill.

PLASTICS—Molded
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS—Synthetic
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTER'S CLEANING COMPOUND
American Chemical Paint Co., Ambler, Pa.

PLATES—Floor or Ceiling Door
Alan Wood Steel Co., Conshohocken, Pa.

American Pressed Steel Co., Phila., Pa.

Carnegie-Illinois Steel Corp. (U. S. Steel
Corp. Subsidiary), Pittsburgh & Chi-
cago.

Central Iron & Steel Co., Harrisburg, Pa.

Inland Steel Co., Chicago.

PLATES—Iron or Steel
Alan Wood Steel Co., Conshohocken, Pa.

American Pressed Steel Co., Phila., Pa.

American Rolling Mill Co., Middletown, O.

Bethlehem (Pa.) Steel Company.

Carnegie-Illinois Steel Corp. (U. S. Steel
Corp. Subsidiary), Pittsburgh & Chi-
cago.

Central Iron & Steel Co., Harrisburg, Pa.

Granite City (Ill.) Steel Co.

Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Ryerson, Joseph T., & Son, Inc., Chicago.

Tennessee Coal, Iron & Railroad Co.
(U. S. Steel Corp. Subsidiary), Birming-
ham, Ala.

Weirton (W. Va.) Steel Co.

Worth Steel Co., Claymont, Del.

Youngstown (Ohio) Sheet & Tube Co., The.

PLATES—Rolled Manganese
Manganese Steel Forge Co., Phila., Pa.

PLUGS—Core Hole
Hubbard, M. D. Spring Co., 750 Central
Ave., Pontiac, Mich.

POLISHING MACHINES
Continental Machine Specialties, Inc.,
Minneapolis, Minn.

POLISHING MACHINES—Bar
Medart Co., The, St. Louis, Mo.

POWER UNITS—Rotary
Cushman Chuck Co., Hartford, Conn.

New Departure Mfg. Co., Bristol, Conn.

POWER UNITS—Straight Line
Cushman Chuck Co., Hartford, Conn.

PRESS BEDS—Pneumatic
Marquette Tool & Mfg. Co., Toledo, Ohio.

PRESS FEEDS—Automatic
Littell, P. J., Mch. Co., Chicago.

PRESSED METAL PARTS
Champion Sheet Metal Co., Inc., cor.
Squires & Duane Sts., Cortland, N. Y.

Crosby Co., The, Buffalo, N. Y.

Stanley Works, The, New Britain, Conn.;
Bridgeport, Conn.

Transue & Williams Steel Forging Corp.,
Alliance, Ohio.

Whitehead Stamping Co., 1669 W. Lafay-
ette Blvd., Detroit, Mich.

PRESSED STEEL PARTS
Crosby Co., The, Buffalo, N. Y.

Lansing (Mich.) Stamping Co., So. Penn Ave.

Parish Pressed Steel Co., Reading, Pa.

Toledo (Ohio) Stamping & Mfg. Co.

Transue & Williams Steel Forging Corp.,
Alliance, Ohio.

Truscon Steel Co., Pressed Steel Div.,
Cleveland.

PRESSES—Automatic
Bliss, E. W., Co., Toledo, Ohio.

Henry & Wright Mfg. Co., The, Hartford,
Conn.

Niagara Mch. & Tool Wks., Buffalo, N. Y.

V & O Press Co., Hudson, N. Y.

PRESSES—Baling
Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Baling, Hydraulic
Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Coining
Bliss, E. W., Co., Toledo, Ohio.

Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Drop—See Hammers—Drop

PRESSES—Foot
Baird Mch. Co., The, Bridgeport, Conn.

Niagara Machine & Tool Works, Buffalo,
N. Y.

Waterbury (Conn.) Farrel Foundry & Ma-
chine Co.

PRESSES—Forging
Mesta Mch. Co., Pittsburgh.

Morgan Engineering Co., The, Alliance, O.

PRESSES—Forming and Bending
Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Mfg. Co., Chicago.

Niagara Mch. & Tool Wks., Buffalo, N. Y.

PRESSES—Friction Screw
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Hydraulic
Baldwin-Southwark Corp., Southwark Div.,
Philadelphia.

Chambersburg (Pa.) Engineering Co.

Elmes, Chas. F., Engng. Wks., Chicago.

Farquhar, A. B., Co., Ltd., York, Pa.

Farrel-Birmingham Co., Inc., Ansonia,
Conn.

Hannifin Mfg. Co., Chicago.

Lake Erie Engineering Corp., 68 Ken-
more St., Buffalo, N. Y.

Mesta Mch. Co., Pittsburgh.

Morgan Engineering Co., The, Alliance, O.

Oilgear Co., The, 1311 W. Bruce, Mil-
waukee.

Wood, R. D., & Co., Philadelphia.

PRESSES—Power
Baird Mch. Co., The, Bridgeport, Conn.

Bliss, E. W., Co., Toledo, Ohio.

Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Mfg. Co., Chicago, Ill.

Farrel-Birmingham Co., Inc., Ansonia,
Conn.

Hyman, Joseph, & Sons, Phila.

Marville, B. J., Mch. Co., Waterbury, Ct.

New Albany (Ind.) Mch. Mfg. Co.

Niagara Machine & Tool Wks., Buffalo, N. Y.

WM. B. **SCALFE** & SONS
OAKMONT PA. **TANKS** PITTSBURGH DISTRICT
FOUNDED 1802

COPPER-BRAZED TANKS

ALSO

'WELDED AND RIVETED CONSTRUCTION

A.S.M.E. CODE

I.C.C. SPECIFICATIONS

WATER PURIFYING APPARATUS

PITTSBURGH

NEW YORK

CHICAGO

**INDUSTRIAL
HEATING ENGINEERS**

DESIGNING CONSULTING CONTRACTING

Guaranteed results on recommendations for
new or improved equipment--processes--
methods for any heating problem.

FLINN AND DREFFEN CO.
308 W. Washington St. Chicago

BELMONT IRON WORKS
PHILADELPHIA NEW YORK EDDYSTONE

Engineers-Contractors-Exporters

STRUCTURAL STEEL—BUILDINGS AND BRIDGES

RIVETED—ARC WELDED

BELMONT INTERLOCKING CHANNEL FLOOR

Write for Catalogue

Main Office: Phila., Pa. New York Office: 44 Whitehall St.

**WIRE AND METAL RIBBON
FORMING MACHINERY**

NILSON TILTING

WIRE REELS

(Wire Reel Catalog No. 51)

Special Machines Designed and Built to Order

THE A. H. NILSON MACHINE COMPANY, BRIDGEPORT, CONN.



**THE
TORRINGTON
SWAGING MACHINE**

—with 4000 forceful squeez-
ing hammer blows per min-
ute—makes metal tougher
and more elastic. Send for
booklet—"The Modern Art
of Swaging."

THE TORRINGTON CO., Standard Plant
55 Field Street Torrington, Conn., U. S. A.

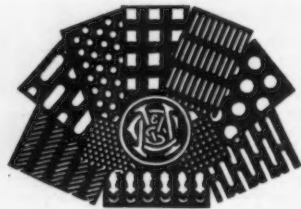
MUNDT

PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—we can perforate almost any size perforation in any kind of metal or material required. Send us your specifications.

Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

Write for Catalog of Patterns



TIN, STEEL, COPPER, ALUMINUM, BRONZE, BRASS, ZINC, ANY METAL, ANY PURPOSE

CHARLES MUNDT & SONS

59 FAIRMOUNT AVE., JERSEY CITY, N. J.

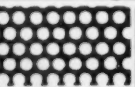
HENDRICK

PERFORATED METALS

Perforated Metal Screens in Steel, Bronze, Stainless Steel, Monel, Aluminum, Everdur and other metals. Perforated Grilles in various metals and many special designs. Mitco Open Steel Flooring, Mitco Shur-Site Treads, Mitco Armorgrids; also elevator buckets, conveyor troughs and products fabricated from heavy plate. Write for catalog.

HENDRICK MFG. CO., 37 Dundaff St., Carbondale, Pa

Sales Offices in Principal Cities
Please Consult Telephone Directory



PERFORATED METALS—SCREENS

Any size perforation — any gauge steel.
Promptly made to your exact specifications.

CHICAGO PERFORATING CO.

2440 W. 24TH PLACE Tel Canal 1459 CHICAGO, ILL.

SINCE 1832

Bradley

The name to remember for CUSHIONED POWER HAMMERS

C.C. BRADLEY & SON, INC.

Syracuse, N.Y.

Products Index

Pels, Henry, & Co., Inc., 90 West St., N. Y. C.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Standard Machinery Co., Providence, R. I.

V & O Press Co., Hudson, N. Y.

Waterbury (Ct.) Farrel Fdry. & Mch. Co.

Zeh & Hahnemann Co., Newark, N. J.

PRESTES—Trimming

Bliss, E. W., Co., Toledo, Ohio.

Chambersburg (Pa.) Engineering Co.

Erle (Pa.) Foundry Co.

Niagara Mch. & Tool Wks., Buffalo, N. Y.

PULLEYS—Iron, Solid & Split

Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.

Jones, W. A. Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

PULLEYS—Magnetic

Cutler-Hammer, Inc., Milwaukee.

PULVERIZERS

Jeffrey Mfg. Co., The, Columbus, Ohio.

Whiting Corp., Harvey, Ill.

PUMPS—Acid Resisting

Durlin Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PUMPS—Boiler Feed

Aldrich Pump Co., The, Allentown, Pa.

Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

PUMPS—Centrifugal

Aldrich Pump Co., The, Allentown, Pa.

Fairbanks, Morse & Co., Chicago.

Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

Pennsylvania Pump & Compressor Co., Easton, Pa.

Rumsey Pump Corp., Seneca Falls, N. Y.

Ruthman Machinery Co., Cincinnati.

Tomkins-Johnson Co., The, Jackson, Mich.

PUMPS—Coolant

Ruthman Machinery Co., Cincinnati.

PUMPS—Electric

Fairbanks, Morse & Co., Chicago.

PUMPS—Hydraulic

Aldrich Pump Co., The, Allentown, Pa.

American Engineering Co., Philadelphia.

Elmes, Chas. F., Engng. Wks., Chicago.

Fairbanks, Morse & Co., Chicago.

Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.

Rumsey Pump Corp., Seneca Falls, N. Y.

Vickers, Inc., 1420 Oakman Blvd., Detroit, Mich.

PUMPS—Power

Fairbanks, Morse & Co., Chicago.

PUMPS—Rotary

Vickers, Inc., 1420 Oakman Blvd., Detroit, Mich.

PUMPS—Rotary Positive, Centrifugal & Turbine

Crane Co., Chicago.

PUMPS—Steam

Fairbanks, Morse & Co., Chicago.

Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

PUMPS—Vacuum

Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.

Pennsylvania Pump & Compressor Co., Easton, Pa.

PUNCHES & DIES

Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

PUNCHING AND SHEARING MACHINES

Crane Co., Chicago.

PUMPS—Steam

Fairbanks, Morse & Co., Chicago.

Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

PUMPS—Vacuum

Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.

Pennsylvania Pump & Compressor Co., Easton, Pa.

PUNCHES & DIES

Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

PUNCHING AND SHEARING MACHINES

Crane Co., Chicago.

PUMPS—Steam

Fairbanks, Morse & Co., Chicago.

Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

PUMPS—Vacuum

Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.

Pennsylvania Pump & Compressor Co., Easton, Pa.

PUNCHES & DIES

Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

PUNCHING AND SHEARING MACHINES

Crane Co., Chicago.

REINFORCEMENT FABRIC—Concrete

Pittsburgh (Pa.) Steel Co.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

RIDDLES—Foundry

Ludlow-Saylor Wire Co., 600-610 S. Newstead Ave., St. Louis, Mo.

RINGS—Iron or Steel

Midvale Co., The, Nicetown, Phila., Pa.

Standard Steel Wks. Co., Burnham, Pa.

RINGS—Welded

American Welding & Mfg. Co., Warren, O.

RIVET MAKING MACHINERY

Acme Machinery Co., Cleveland.

Manville, E. J. Mch. Co., Waterbury, Ct.

Waterbury (Conn.) Farrel Foundry & Machine Co.

RIVET SETS

Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

RIVETING MACHINES

Hannifin Mfg. Co., Chicago.

Shuster, F. B., Co., The, New Haven, Ct.

RIVETS

Blake & Johnson Co., The, Waterville, Ct.

Clark Bros. Bolt Co., Milldale, Conn.

Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.

Oliver Iron & Steel Corp., Pittsburgh.

Progressive Mfg. Co., Torrington, Conn.

Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.

RODS—Aluminum

Aluminum Co. of America, Pittsburgh.

RODS—Brass

American Brass Co., The, Waterbury, Conn.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

RODS—Magnesium Alloys

Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

RODS—Nickel Silver

American Brass Co., The, Waterbury, Conn.

Riverside (N. J.) Metal Co.

Seymour (Conn.) Mfg. Co.

RODS—Phosphor Bronze

American Brass Co., The, Waterbury, Conn.

Phosphor Bronze Smelting Co., The, Phila.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

RODS—Welding

Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

American Brass Co., The, Waterbury, Conn.

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Lincoln Electric Co., The, Cleveland.

Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

Metal & Thermit Corp., 120 B'way, N. Y. C.

Pittsburgh (Pa.) Steel Co.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

Una Welding, Inc., Cleveland, Ohio.

RODS—Wire

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Bethlehem (Pa.) Steel Co.

Jones & Laughlin Steel Corp., Pittsburgh.

Pittsburgh (Pa.) Steel Co.

Wickwire Brothers, Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

Youngstown (Ohio) Sheet & Tubing Co., The

ROLLING MACHINERY—Cold Rolling

Bliss, E. W., Co., Toledo, Ohio.

Lewis Foundry & Mch. Co., Pittsburgh.

United Engineering & Fdry. Co., Pith.

ROLLING MACHINERY—Sheet Metal

Lewis Foundry & Mch. Co., Pittsburgh.

Streine Tool & Mch. Co., New Bremen, Ohio.

ROLLING MILL MACHINERY

Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Bliss, E. W., Co., Toledo, Ohio.

Farrel-Birmingham Co., Inc., Ansonia, Ct.

Hyde Park (Pa.) Fdry. & Mch. Co.

Lewis Foundry & Mch. Co., Pittsburgh.

Mackintosh-Hemphill Co., Pittsburgh.

Mesta Mch. Co., Pittsburgh.

National Roll & Fdry. Co., Avonmore, Pa.

Pittsburgh (Pa.) Rolls Corp.

United Engineering & Fdry. Co., Pith.

ROLLS—Special Hardened

Midvale Co., The, Nicetown, Phila., Pa.

Products Index

ROOFING—Special Copper Bearing Steel
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Corrugated and
Plain

American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel
Corp. Subsidiary), Pittsburgh & Chi-
cago.

Newport (Ky.) Rolling Mill Co., The.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

ROOFING AND SIDING—Genuine Open
Hearth Iron

Newport (Ky.) Rolling Mill Co.

ROOFING AND SIDING—Iron and Steel
Inland Steel Co., Chicago.

Newport (Ky.) Rolling Mill Co., The.

ROOFING AND SIDING—(Zinc)—Corrugated
& Plain

New Jersey Zinc Co., The, 160 Front St.,
N. Y. C.

RUBBER LININGS

American Hard Rubber Co., 11 Mercer
St., N. Y. C.

Goodrich, B. F. Co., The, Akron, Ohio.

Goodyear Tire & Rubber Co., Akron, Ohio.

RUBBER MOLDED PARTS

American Hard Rubber Co., 11 Mercer
St., N. Y. C.

Goodyear Tire & Rubber Co., Akron, Ohio.

Manhattan Rubber Mfg. Div. of Ray-
bestos-Manhattan, Inc., The, 2 Town-
send St., Passaic, N. J.

Richardson Co., The, Melrose Park, Ill.

RUST PREVENTIVES

American Chemical Paint Co., Ambler, Pa.

American Lanolin Corp., Lawrence, Mass.

Parker Rust-Proof Co., 2186 Milwaukee
Ave., Detroit.

RUST PROOFING COMPOUNDS

Parker Rust-Proof Co., 2186 Milwaukee
Ave., Detroit.

RUST PROOFING PROCESS

American Chemical Paint Co., Ambler, Pa.

Parker Rust-Proof Co., 2186 Milwaukee
Ave., Detroit.

Udylite Co., The, Detroit.

RUST REMOVING

Nukem Products Corp., 68 Niagara St.,
Buffalo, N. Y.

**SAND BLAST EQUIPMENT AND MA-
CHINES**

American Foundry Equipment Co., The,
401 Hyrkit St., Mishawaka, Ind.

Pangborn Corporation, Hagerstown, Md.

SAND BLAST STEEL SHOT

American Foundry Equipment Co., The,
401 Hyrkit St., Mishawaka, Ind.

Pittsburgh (Pa.) Crushed Steel Co.

SAND HANDLING EQUIPMENT

Hartlett, C. O., & Snow Co., The, Clevel-
and.

Jeffrey Mfg. Co., The, Columbus, Ohio.

SAND RAMMERS

Chicago Pneumatic Tool Co., 6 East 44th
St., N. Y. C.

SAWING MACHINES—Metal

Espen-Lucas Mch. Works, Phila.

Peerless Mch. Co., Racine, Wis.

SAWING MACHINES—Metal-Band

Continental Machine Specialties, Inc.,
Minneapolis, Minn.

SAWS—Band and Hack for Metal

Armstrong-Blum Mfg. Co., Chicago.

Atkins, E. C., & Co., Indianapolis.

Diston, Henry, & Sons, Inc., Philadelphia.

Wells Mfg. Corp., Three Rivers, Mich.

SAWS—Circular, Rip & Cutoff

Atkins, E. C., & Co., Indianapolis.

SAWS—Friction

Atkins, E. C., & Co., Indianapolis.

Diston, Henry, & Sons, Inc., Philadelphia.

SAWS—Hack Saw Blades

Atkins, E. C., & Co., Indianapolis.

Peerless Mch. Co., Racine, Wis.

Starrett, L. S. Co., Athol, Mass.

SAWS—Hot Metal

Atkins, E. C., & Co., Indianapolis.

Diston, Henry, & Sons, Inc., Philadelphia.

SAWS—Inserted Tooth, Cold

Diston, Henry, & Sons, Inc., Philadelphia.

Tabor Mfg. Co., Philadelphia.

SAWS—Milling

Atkins, E. C., & Co., Indianapolis.

Diston, Henry, & Sons, Inc., Philadelphia.

SCALES

Exact Weight Scale Co., The, Columbus,
Ohio.

Fairbanks, Morse & Co., Chicago.

Streeter-Amel Co., Chicago.

SCREENS—Manganese Steel

Manganese Steel Forge Co., Phila., Pa.

SCREENS—Perforated Metal

Chicago Perforating Co., 2440 W. 24th
Place, Chicago, Ill.

Diamond Mfg. Co., Wyoming, Pa.

Erill Perforating Co., Rochester, N. Y.

Harrington & King Perforating Co., Chl.

Hendrick Mfg. Co., Carbondale, Pa.

Mundt, Chas., & Sons, 59 Fairmount
Ave., Jersey City, N. J.

SCREENS—Woven Wire

Ludlow-Saylor Wire Co., 600-610 S. New-
stead Ave., St. Louis, Mo.

Michigan Wire Cloth Co., 2117 Howard
St., Detroit.

Wickwire Brothers, Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd
St., N. Y. C.

SCREW MACHINE PRODUCTS

Barnes, Wallace, Bristol, Conn.

Blake & Johnson Co., The, Waterville, Ct.

Commonwealth Brass Corp., Detroit.

Eastern Mch. Screw Corp., New Haven.

Houde Engineering Corp., Buffalo, N. Y.

National Acme Co., The, Cleveland.

Olson Mfg. Co., Worcester, Mass.

Otemiller, Wm. H., Co., Inc., York, Pa.

Progressive Mfg. Co., Torrington, Conn.

Screw Mch. Products Corp., Prov., R. I.

SCREW MACHINERY—Automatic

Cone Automatic Mach. Co., Inc., Windsor,
Vt.

National Acme Co., The, Cleveland.

SCREW MACHINERY—Hand

Warner & Swasey Co., The, Cleveland.

SCREW MACHINERY—Multiple Spindle

Acme Machine Tool Co., Cincinnati.

Cone Automatic Mach. Co., Inc., Windsor,
Vt.

National Acme Co., The, Cleveland.

SCREW PLATES

Greenfield (Mass.) Tap & Die Corp.

SCREW STOCK

Bliss & Laughlin, Inc., Harvey, Ill.

Union Drawn Steel Co., Massillon, Ohio.

SCREWS—Cap

Bristol Co., The, Waterbury, Conn.

Cleveland (Ohio) Cap Screw Co., The.

National Acme Co., The, Cleveland.

Otemiller, Wm. H., Co., Inc., York, Pa.

SCREWS—Machine

Blake & Johnson Co., The, Waterville, Ct.

Progressive Mfg. Co., The, Torrington, Ct.

Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Set

Bristol Co., The, Waterbury, Conn.

Cleveland (Ohio) Cap Screw Co., The.

National Acme Co., The, Cleveland.

Otemiller, Wm. H., Co., Inc., York, Pa.

SCREWS, Socket, Head, Cap

Bristol Co., The, Waterbury, Conn.

Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Thumb

Parker-Kalon Corp., 196 Varick St., N. Y.

SCRUBBING MACHINES—Sheet

Wean Engineering Co., Inc., The, Warren,
Ohio.

SCYTHE STONES AND WHETSTONES

Carborundum Co., The, Niagara Falls, N. Y.

**SECOND - HAND MACHINERY—(See
Clearing House Section)**

SEPARATORS—Magnetic

Dings Magnetic Separator Co., Milwaukee.

Ohio Electric Mfg. Co., The, 5908 Maurice
Ave., Cleveland.

SHAFTING—Cold Drawn

Union Drawn Steel Co., Massillon, Ohio.

Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAFTING—Steel

Bliss & Laughlin, Inc., Harvey, Ill.

Union Drawn Steel Co., Massillon, Ohio.

SHAFTING—Turned and Ground

Bliss & Laughlin, Inc., Harvey, Ill.

Moltrup Steel Products Co., Beaver Falls,
Pa.

Ryerson, Jos. T., & Son, Inc., Chicago.

Union Drawn Steel Co., Massillon, Ohio.

Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPERS

Cincinnati (Ohio) Shaper Co., The.

SHAPERS—Vertical

Pratt & Whitney Div. Niles-Bement-Pond
Co., Hartford, Conn.

SHAPES—Cold Drawn

Bliss & Laughlin, Inc., Harvey, Ill.

Union Drawn Steel Co., Massillon, Ohio.

Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPES—Wire

Cuyahoga Shaping Co., The, Cleveland.

Eastern Tool & Mfg. Co., Bloomfield, N. J.

Lee Spring Co., Inc., 30 Main St., Brook-
lyn, N. Y.

Roebbing's, John A. Sons Co., Trenton,
N. J.

SHEAR BLADES & KNIVES

American Shear Knife Co. Homestead, Pa.

Heppenstall Co., Pittsburgh.

SHEARING MACHINES—Alligator

Canton Fdry. & Mch. Co., Cleveland.

**SHEARING MACHINES—Angle, Hand
and Power**

Federal Bearings Co., Inc., The, Pough-
keepsie, N. Y.

G. D. S. Shearing & Punching Machine
Co., 101 Walker St., N. Y. C.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

SHEARING MACHINES—Bar

G. D. S. Shearing & Punching Machine
Co., 101 Walker St., N. Y. C.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

United Engineering & Fdry. Co., Pgh.

**SHEARING MACHINES—Beam and
Channel**

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES—Billet

Morgan Engineering Co., The, Alliance, O.

Pels Henry, & Co., Inc., 90 West St.,
N. Y. C.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

United Engineering & Fdry. Co., Pgh.

**SHEARING MACHINES—Sheet and
Pack**

Aetna-Standard Engineering Co., The,
Youngstown, Ohio.

SHEARING MACHINES—Plate

Bertsch & Co., Cambridge City, Ind.

Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Mfg. Co., Chicago.

Mesta Mch. Co., Pittsburgh.

Morgan Engineering Co., The, Alliance, O.

Niagara Machine & Tool Works, Buffalo,
N. Y.

Pels, Henry & Co., Inc., 90 West St.,
N. Y. C.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

United Engineering & Fdry. Co., Pgh.

**SHEARING MACHINES—Sheet and
Plate**

Beatty Mch. & Mfg. Co., 236-150th St.,
Hammond, Ind.

Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Mfg. Co., Chicago.

Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARING MACHINES—Squaring

Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Co., Chicago.

Niagara Mach. & Tool Wks., Buffalo, N. Y.



A BAG—or a Truck Load?

**FOR LOWEST
BLAST CLEANING COSTS**


One bag of "Certified" Steel Grit, or Steel Shot, will do the work of a Truckload of Sand . . . and do it quicker, at lower cost per ton, with less dust, than any other abrasive on the market. If you are interested in reduced cleaning costs and greater profits—use "CERTIFIED" STEEL ABRASIVES.



PITTSBURGH CRUSHED STEEL CO.
PITTSBURGH, PENNA.

STEEL SHOT AND GRIT CO.
BOSTON, MASS.

13/2x13/2x19



**ELECTRIC SHEET METAL ARC WELDER
A GREYHOUND PRODUCT**

A newly designed welder for sheet metals. Operates on 110 volts, 50-60 cycles A.C. Guaranteed to weld 12 to 22 gauge metals. The proven results of 10 years of research. The sheet metal welder you have been waiting for. A real job. Built to last.

Also: A 220 volts—50-60 cycles A.C. sheet metal welder—Price \$75.00 F.O.B. Brooklyn, N. Y.

Other Greyhound electric arc welders, from 20 to 400 amperes. Priced from \$39.50 up. For information, write

GREYHOUND MFG. CO.
988 ATLANTIC AVE., BROOKLYN, N. Y.



DO-YOU GET YOUR COPY EACH MONTH?

INDUSTRIAL GAS FURNACES

For batch or continuous heat treating.

Blowpipes and special burners. In writing, please mention "Iron Age."

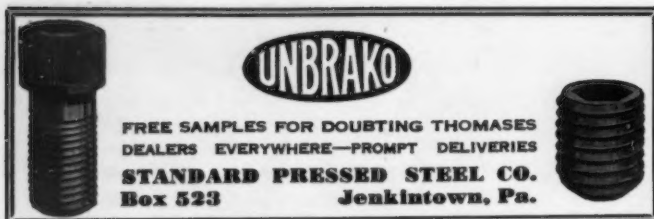
American Gas Furnace Co., Elizabeth, N. J.

MOORE RAPID

LECTROMELT FURNACES

For the rapid and economic melting and refining of gray and malleable irons, carbon and alloy steels, etc.

PITTSBURGH LECTROMELT FURNACE CORPORATION
P. O. Box 1257
Pittsburgh, Pa.



UNBRAKO

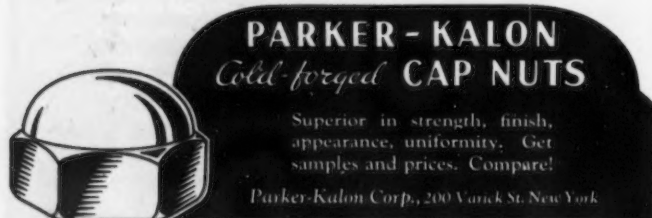
FREE SAMPLES FOR DOUBTING THOMASES
DEALERS EVERYWHERE—PROMPT DELIVERIES
STANDARD PRESSED STEEL CO.
Box 523 Jenkintown, Pa.



SCREW MACHINE PRODUCTS

CAP AND SET SCREWS

WM. H. OTTEMILLER CO., Inc.
Pattison St. & M & P R R York, Pa.



PARKER - KALON
Cold-forged **CAP NUTS**

Superior in strength, finish,
appearance, uniformity. Get
samples and prices. Compare!

Parker-Kalon Corp., 200 Varick St. New York

SCREW MACHINE PRODUCTS
ACCURATELY MADE AT A FAIR PRICE

ARE MORE ECONOMICAL

Specialists in the production of screw machine products for 15 years. Let us quote on your requirements.
Screw Machine Products Corp., 1014 Eddy St., Providence, R.I.



NAILS, RIVETS & SCREWS MADE TO ORDER IN ANY METAL
JOHN HASSALL, INC. EST. 1850 CLAY & OAKLAND STS., BROOKLYN, N.Y.

ROLL LATHES

The Hyde Park kind are manufactured from correctly made castings of heavy and rigid construction and built to last many years. Handled by an experienced mill man. Tell us when you expect to place your next order.

ROLLS (Sand and Chilled) ROLL LATHES
IRON CASTINGS, TIN PLATE MACHINERY
HYDE PARK FOUNDRY & MACHINE CO.
HYDE PARK (Conemaugh Div. P. R. R.) PA.

COUNT pieces, operations, trips,
from flashes of light to freight cars.
MEASURE lengths, volumes, speeds,
production . . . with
Veeder-Root Counters.

For complete information write:
VEEDER-ROOT, INC.
HARTFORD, CONN., U. S. A.



MITCO
OPEN STEEL FLOORING

Pressure Formed • 90% Open Area • Easy to Install
HENDRICK MANUFACTURING COMPANY
37 Dundaff Street, Carbondale, Pa.

Products Index

SHEARS—Hand for Sheet Metal
Bremil Mfg. Co., Erie, Pa.

SHEET BARS
Andrews Steel Co., The, Newport, Ky.
Jones & Laughlin Steel Corp., Pittsburgh.

SHEET METAL MACHINERY
Bliss, E. W., Co., Toledo, Ohio.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Kane & Roach, Inc., Syracuse, New York.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Mach. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.
Waterbury (Conn.) Farrel Foundry & Machine Co.

SHEETS—Aluminum
Aluminum Co. of America, Pittsburgh.

SHEETS—Auto Body
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Black
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Granite City (Ill.) Steel Co.
Ingersoll Steel & Disc Co., Chicago.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.

SHEETS—Blue Annealed
Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Central Iron & Steel Co., Harrisburg, Pa.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Granite City (Ill.) Steel Co.
Great Lakes Steel Corp., Detroit.
Newport (Ky.) Rolling Mill Co., The.
Ryerson, Jos. T. & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.

Worth Steel Co., Claymont, Del.
SHEETS—Bronze, Copper, Nickel, Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Philadelphia.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

SHEETS—Chrome
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Chrome Nickel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Cold Rolled
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Weirton (W. Va.) Steel Co.

SHEETS—Copper Alloy
American Brass Co., The, Waterbury, Conn.

SHEETS—Copper Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.

SHEETS—Electrical
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.

SHEETS—Enameling
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.

SHEETS—For Drawing and Stamping
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jos. T. & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Worth Steel Co., Claymont, Del.

SHEETS—Full Finished
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Galvanized, Flat and Corrugated
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T. & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Long Terne
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Newport (Ky.) Rolling Mill Co., The.
Weirton (W. Va.) Steel Co.

SHEETS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

SHEETS—Metal Furniture
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.

SHEETS—Picked
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Newport (Ky.) Rolling Mill Co., The.

SHEETS—Tin Mill Black
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Newport (Ky.) Rolling Mill Co., The.

SHEETS—Zinc
New Jersey Zinc Co., The, 160 Front St.

SHELVING—Steel
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

SILICO—MANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SILICON METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SLABS
Andrews Steel Co., The, Newport, Ky.

SLINGS—Wire Rope
Babbling's, John A., Sons Co., Trenton, N. J.

SOLVENTS—Oil & Grease
Detroit Rex Products Co., Detroit, Mich.

SPACING TABLES—Punching & Shearing
Thomas Spacing Mach. Co., Pittsburgh.

SPECIAL MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.

Bullard Co., The, Bridgeport, Conn.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Farquhar, A. B., Co., Ltd., York, Pa.
Houde Engineering Corp., Buffalo, N. Y.
Manville, E. J., Mch. Co., Waterbury, Conn.
Morgan Engineering Co., The, Alliance, O.
Taft-Pelree Mfg. Co., The, Woonsocket, R. I.
Wood, R. D. & Co., Philadelphia.

SPECIALTIES—Rubber Covered & Lined
American Hard Rubber Co., 11 Mercer St., N. Y. C.

Goodrich, R. F., Co., The, Akron, Ohio.

SPEED REDUCERS
Boston Gear Wks. Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Footo Gear Wks. Inc., 1915 S. Cicero Ave., Cicero, Ill.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.

James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Philadelphia (Pa.) Gear Works.

SPIEGELEISEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SPIKES—Track
Ames, W. & Co., Jersey City, N. J.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Weirton (W. Va.) Steel Co.

SPINDLES—Grinding
Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.

SPINDLES—Hollow Bored
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

SPLICE BARS
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Products Index

SPRAY FINISHING EQUIPMENT

DeVilbiss Co., The, Toledo, Ohio.

SPRAYERS—Paint

DeVilbiss Co., The, Toledo, Ohio.

SPRING MAKING MACHINERY

Baird Mch. Co., The, Bridgeport, Conn.

Sleeper & Hartley, Inc., Worcester, Mass.

SPRINGS—Car

Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

SPRINGS—Extension, Compression, Torsion or Flat

Amer. Spring & Mfg. Corp., Holly, Mich.

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Barnes-Gibson-Raymond, Inc., Detroit.

Barnes, Wallace, Co., The, Bristol, Conn.

Cook Springs Co., Div. of Barnes-Gibson-Raymond, Inc., Ann Arbor, Mich.

Cuyahoga Spring Co., The, Cleveland.

Dunbar Bros. Co., Bristol, Conn.

Gibson, Wm. D., Co., Chicago.

Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

Raymond Mfg. Co., Corry, Pa.

U. S. Steel Wire Spring Co., Cleveland, O.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SPROCKETS

Baldwin-Duckworth Chain Corp., Springfield, Mass.

Boston Gear Wks., Inc., North Quincy, Mass.

Diamond Chain & Mfg. Co., Indianapolis, Ind.

Morse Chain Co., Ithaca, New York.

Whitney Chain & Mfg. Co., Hartford, Ct.

STAMPINGS OR DRAWINGS—Metal

Barnes-Gibson-Raymond, Inc., Detroit.

Barnes, Wallace, Co., The, Bristol, Conn.

Central Iron & Steel Co., Harrisburg, Pa.

Champion Sheet Metal Co., Inc., Cor.

Squires & Duane Sts., Cortland, N. Y.

Cook Spring Co., Div. of Barnes-Gibson-Raymond, Inc., Ann Arbor, Mich.

Crosby Co., The, Buffalo, N. Y.

Dunbar Bros. Co., Bristol, Conn.

Eastern Tool & Stg. Co., Inc., Saugus, Mass.

Gibson, Wm. D., Co., Chicago.

Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

Lansing (Mich.) Stamping Co., So. Penn. Ave.

Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

Loon (Mass.) Buckle Mfg. Co.

Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

Parish Pressed Steel Co., Reading, Pa.

Raymond Mfg. Co., Corry, Pa.

Ryan, W. S., Co., 4363 Woodward Ave., Detroit.

Sheet Metal Specialty Co., Pittsburgh, Pa.

Toledo (Ohio) Stamping & Mfg. Co.

Torrington (Conn.) Company

Transue & Williams Steel Forging Corp., Alliance, Ohio.

Truscon Steel Co., Pressed Steel Div., Cleveland.

Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.

Worcester (Mass.) Stamped Metal Co.

STAMPS—Steel Alphabets and Figures

Cunningham, M. E., Co., Pittsburgh.

Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

STAPLES—Wire

Wickwire Brothers, Cortland, N. Y.

STEEL—Acid Resisting

Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

STEEL—Alloy

Alan Wood Steel Co., Conshohocken, Pa.

Andrews Steel Co., The, Newport, Ky.

Bethlehem (Pa.) Steel Company.

Bissett Steel Co., The, Cleveland.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.

Harrisburg (Pa.) Steel Corp.

Ingersoll Steel & Disc Co., Chicago.

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jos. T., & Son, Inc., Chicago.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

Vanadium-Alloys Steel Co., Latrobe, Pa.

Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—Alloy, Cold Drawn

Bliss & Laughlin, Inc., Harvey, Ill.

Moltrup Steel Products Co., Beaver Falls, Pa.

Union Drawn Steel Co., Massillon, Ohio.

Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Bright Finished

Bliss & Laughlin, Inc., Harvey, Ill.

Union Drawn Steel Co., Massillon, Ohio.

STEEL—Carbon

Andrews Steel Co., The, Newport, Ky.

Bethlehem (Pa.) Steel Co.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Harrisburg (Pa.) Steel Corp.

Ingersoll Steel & Disc Co., Chicago.

Latrobe (Pa.) Electric Steel Co.

STEEL—Carbon Vanadium

Andrews Steel Co., The, Newport, Ky.

Latrobe (Pa.) Electric Steel Co.

STEEL—Case Hardening

Monarch Steel Co., Indianapolis, Ind.

STEEL—Chrome

Andrews Steel Co., The, Newport, Ky.

Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.

Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Manganese

Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel

Andrews Steel Co., The, Newport, Ky.

Harrisburg (Pa.) Steel Corp.

Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel Silver

Ingersoll Steel & Disc Co., Chicago.

STEEL—Chrome Vanadium

Andrews Steel Co., The, Newport, Ky.

Harrisburg (Pa.) Steel Corp.

Latrobe (Pa.) Electric Steel Co.

STEEL—Cobalt

Darwin & Milner, Inc., Cleveland.

STEEL—Cold Drawn

Bliss & Laughlin, Inc., Harvey, Ill.

Jones & Laughlin Steel Corp., Pittsburgh.

Latrobe (Pa.) Electric Steel Co.

Moltrup Steel Products Co., Beaver Falls, Pa.

Monarch Steel Co., Indianapolis, Ind.

Rathbone, A. B. & J., Palmer, Mass.

Ryerson, Joseph T., & Son, Inc., Chicago.

Union Drawn Steel Co., Massillon, Ohio.

Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Cold Rolled Strips

Acme Steel Co., Chicago.

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Athena Steel Co., 135 William St., N. Y.

Bethlehem (Pa.) Steel Co.

Griffin Mfg. Co., Erie, Pa.

Latrobe (Pa.) Electric Steel Co.

Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jos. T., & Son, Inc., Chicago.

Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Stanley Works, The, New Britain, Conn.

Steel & Tubes, Inc., Cleveland.

Superior Steel Corp., Grant Bldg., Pgh.

Thomas Steel Co., The, Warren, Ohio.

Weirton (W. Va.) Steel Co.

Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Cold Rolled Strips, Electric Copper Coated

Acme Steel Co., Chicago, Ill.

Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro Tin Coated

Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Stainless

Acme Steel Co., Chicago.

Griffin Mfg. Co., Erie, Pa.

STEEL—Corrosion Resisting

Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.

Midvale Co., The, Nicetown, Phila., Pa.

STEEL—Crucible

Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Cutlery

Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

STEEL—Die

Andrews Steel Co., The, Newport, Ky.

Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.

Diston, Henry, & Sons, Inc., Philadelphia.

Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Drill

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Electric

Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.

Diston, Henry, & Sons, Inc., Philadelphia.

Ludlum Steel Co., Watervliet, N. Y.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

Vanadium-Alloys Steel Co., Latrobe, Pa.

Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—Hot Rolled Strips

Acme Steel Co., Chicago.

Bethlehem (Pa.) Steel Co.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Great Lakes Steel Corp., Detroit.

Inland Steel Co., Chicago.

Laclede Steel Co., St. Louis, Mo.

Latrobe (Pa.) Electric Steel Co.

Republic Steel Corp., Cleveland, Ohio.

Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Stanley Works, The, New Britain, Conn.

Bridgeport, Conn.

Steel & Tubes, Inc., Cleveland.

GIBSON-SPRINGS

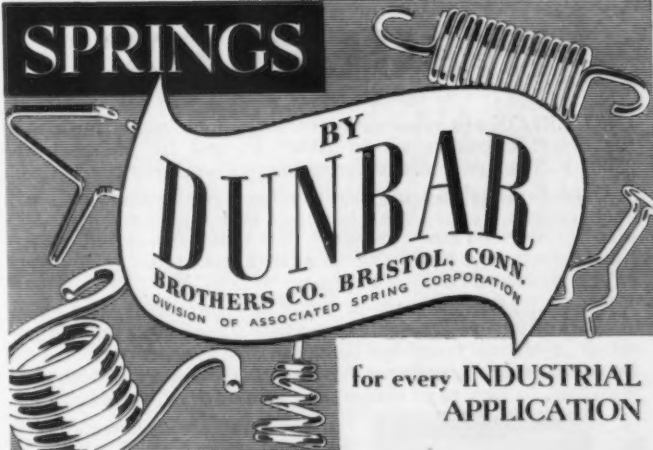
and wire forms in all types and sizes from 2" rectangular to smallest music wire—and from heaviest to thinnest of special flat work, either springs or stampings



Send in your specifications for an estimate. Prices are no more than elsewhere when equivalent quality is sought.

WM. D. GIBSON COMPANY
1800 CLYBOURN AVE. • CHICAGO, ILL.

SPRINGS



for every INDUSTRIAL APPLICATION

SPRINGS

COIL, FLAT and WIRE FORMS for every mechanical need

• Get Quotations •

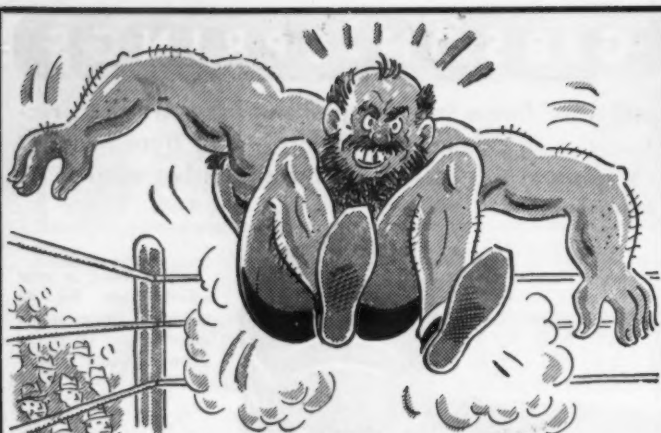
AMERICAN SPRING & MFG. CORP.
HOLLY - MICHIGAN

SPRINGS

wire forms and springs of flat spring steel. We specialize in lighter wire gages.

U. S. STEEL WIRE SPRING COMPANY

East 53rd St. & Hamilton Ave., Cleveland, Ohio



Where Floors Take a **POUNDING... use RUGGEDWEAR RESURFACER**

ASK FOR
INFORMATION
No charge or obligation

Repair concrete to a feather edge. . .
At 14c or less per square foot. . . A
firmer, smoother, tougher wearing surface
. . . PERMANENT.

FLEXROCK COMPANY
892 No. Delaware Ave., Philadelphia, Pa.



RUGGEDWEAR
SWEEP-MIX-APPLY • THIRTY HOURS DRY

INSULBLOX*

(REG. U. S. PAT. OFF.)

INSULBLOX are superior refractory block insulation used for direct exposure up to 2000° F. and for indirect at 2200° F. They permit the use of insulation closer to the fire.

Used for backing up thin fire brick walls and roofs of open hearth, forge, heat treating and melting furnaces; also for regenerator chambers, hot blast stoves, oil stills, lining ducts and flues, and to assure maximum insulating effectiveness on boiler settings up to 2200° F.

INSULBLOX, because of their calcined stable fire clay base stand severe service. Do not lose their insulating properties or shrink from the brickwork where properly used. Do not dissolve or collapse from contact with water and are resistant to vapors of steam, oil, acid or alkaline solutions.



INSULBLOX

Cover large areas quickly with minimum joints.

For further information write for copy of "APPEAL TO REASON"

QUIGLEY COMPANY, INC.

56 W. 45th Street, New York, N. Y.

Makers of HYTEMPITE, "The World's Standard High Temperature Cement"

Distributors with Stocks and Service in Important Industrial Centers throughout the United States, Canada, and in 32 other countries.

INSULBLOX are made in standard thicknesses—1" to 6". Pick your thickness and avoid waste. Large-size units reduce installation costs and joint losses.

The heat storage capacity of INSULBLOX is about one-fortieth that of fire brick for the same heat flow. 1" thickness of INSULBLOX is equal in insulating properties to about 9" of fire brick.

*INSULBLOX are made of INSULINE—a new stable, calcined, fire clay base material of thin walled minute cellular structure—with light-weight, low heat storage, refractory and insulating properties.

Superior Steel Corp., Grant Bldg., Pgh.
Weirton (W. Va.) Steel Co.

STEEL—Hot Rolled Strips, Electro Zinc Coated

Thomas Steel Co., The, Warren, Ohio.
STEEL—Hot Rolled Strips, Galvanized

Acme Steel Co., Chicago.

STEEL—Magnet

Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.

STEEL—Nickel

Andrews Steel Co., The, Newport, Ky.

STEEL—Open Hearth

Andrews Steel Co., The, Newport, Ky.

STEEL—Reel Manganese

Pittsburgh (Pa.) Steel Co.

Timken Roller Bearing Co., The, Canton, O.

STEEL—Reel Steel

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL—Rustless

Acme Steel Co., Chicago.

STEEL—Screw

Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.

STEEL—Special Analysis

Andrews Steel Co., The, Newport, Ky.

STEEL—Spring

Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.

STEEL—Stainless

Acme Steel Co., Chicago.

STEEL—Tool

Bethlehem (Pa.) Steel Company.

STEEL—Vanadium

Andrews Steel Co., The, Newport, Ky.

STEEL PLANTS AND ROLLING MILLS

Brassett, H. A., & Co., Chicago, Ill.

STEEL ROLLS

United Engineering & Fdry. Co., Pgh.

STOCKS

Babcock & Wilcox, The, 85 Liberty St., New York City.

STOP WATCHES

Stillman, M. J., Co., Inc., Chicago.

STOPS—Crane Limit

Electric Controller & Mfg. Co., The, Cleveland.

STRAIGHTENING MACHINES—Bar & Tube

Aetna-Standard Engineering Co., The, Youngstown, Ohio.

STRAIGHTENING MACHINES—Wire

Kane & Roach, Inc., Syracuse, New York.

STRUCTURAL IRON AND STEEL WORK

American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

Bethlehem (Pa.) Steel Co.
Morgan Engineering Co., The, Alliance, O.

STRUCTURAL STEEL—See Angles, Beams, Channels and Tees

STUDS

Erie (Pa.) Bolt & Nut Co.

SUPERHEATERS

Babcock & Wilcox Co., The, 85 Liberty St., New York City.

SWAGING MACHINES

Standard Machinery Co., Providence, R. I.

SWITCHES—Electric

Westinghouse Elec. & Mfg. Co., East Pgh.

TANK LININGS

Cellulose Co., The, Cleveland.

TANK LININGS—Rubber

American Hard Rubber Co., 11 Mercer St., N. Y. C.

TANKS—Alkali Cleaning

Detroit Hex Products Co., Detroit, Mich.

TANKS—Compressed Air, Gas, Oil and Water

Scaife, Wm. B., & Sons Co., Pgh.

TANKS—Iron and Steel

Scaife, Wm. B., & Sons Co., Pgh.

TANKS—Pickling

American Hard Rubber Co., 11 Mercer St., N. Y. C.

TANKS—Rubber Lined

American Hard Rubber Co., 11 Mercer St., N. Y. C.

TANKS—Welded

National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

TANTALUM CARBIDE

Scaife, Wm. B., & Sons Co., Pittsburgh.

TAPPING MACHINES

Baker Bros, Inc., Toledo, Ohio.

TAPS—Collapsing

Landis Mach. Co., Inc., Waynesboro, Pa.

TAPS AND DIES

Greenfield (Mass.) Tap & Die Corp.

TEES—See Angles, Beams, Channels and Tees

TELEPHONES—Interior

Screw Machine Products Corp., Prov., R. I.

TERNE PLATES

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

TESTING MACHINES—Materials

Baldwin-Southwark Corp., Southwark Div., Phila.

THERMOMETERS—Recording

Bristol Co., The, Waterbury, Conn.

THREAD CUTTING TOOLS—See Die Taps

THREAD ROLLING MACHINES

Manville, E. J., Mch. Co., Waterbury, Ct.

THREADING MACHINES—Automatic

Landis Mach. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Belt

Murphy Machine & Tool Co., Detroit.

TIE PLATES

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

TIES—BALE

Acme Steel Co., Chicago, Ill.

TIMING INSTRUMENTS

Stillman, M. J., Co., Inc., Chicago.

TIN PLATE

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

TIN PLATE MACHINERY

Aetna-Standard Engineering Co., The, Youngstown, Ohio.

TIN PLATE MACHINERY

Wean Engineering Co., Inc., The, Warren, Ohio.

Products Index

TINNING EQUIPMENT—Sheets
Wean Engineering Co., Inc., The, Warren, Ohio.

TONGS—Automatic
Heppenstall Co., Pittsburgh.

TOOL BITS
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

Vanadium-Alloys Steel Co., Vascology-Ramet Div., North Chicago, Ill.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago.
Williams, J. H. & Co., Buffalo, N. Y.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago.
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

Vanadium-Alloys Steel Co., Vascology-Ramet Div., North Chicago, Ill.

TOOLS—Metal Cutting
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

Michigan Tool Co., Detroit, Mich.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

Vanadium-Alloys Steel Co., Vascology-Ramet Div., North Chicago, Ill.

TOOLS—Precision
Starrett, L. S. Co., Athol, Mass.

Vanadium-Alloys Steel Co., Vascology-Ramet Div., North Chicago, Ill.

TOOLS—Safety, Steel Stamp
Cunningham, M. E. Co., Pittsburgh.

TOOLS—Tantalum Carbide
Vanadium-Alloys Steel Co., Vascology-Ramet Div., North Chicago, Ill.

TOOLS—Tungsten Carbide
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.

TORCHES—Brazing, Cutting and Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

TORCHES—Gas
Torit Mfg. Co., St. Paul, Minn.

TRACTORS AND TRAILERS—See Trucks, Tractors and Trailers—Industrial

TRAILERS—Industrial—See Trucks, Tractors and Trailers—Industrial

TRAMRAILS—Overhead Systems
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

TRAMWAYS—Wire Rope
Leschen, A. & Sons Rope Co., St. Louis, Mo.

TRANSMISSIONS—Hydraulic
American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

Vickers, Inc., 1420 Oakman Blvd., Detroit, Mich.

TRANSMISSIONS—Variable Speed
Link-Belt Co., Chicago.
Reeces Pulley Co., Columbus, Indiana.

TREADS—Safety
American Pressed Steel Co., Phila., Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Hendrick Mfg. Co., Carbondale, Pa.
Norton Co., Worcester, Mass.

TRUCKS—Dump (Industrial)
Towmotor, Inc., Cleveland.

TRUCKS—Elevating (Power)
Baker-Haulung Co., 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

Towmotor, Inc., Cleveland.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Lift (Hand & Foot)
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Scoop (Industrial)
Towmotor, Inc., Cleveland.

TRUCKS, TRACTORS AND TRAILERS—Industrial
Atlas Car & Mfg. Co., The, Cleveland.
Baker-Haulung Co., 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

Towmotor, Inc., Cleveland.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TUBE MILL MACHINERY
Aetha-Standard Engineering Co., The, Youngstown, Ohio.
United Engineering & Fdry. Co., Pith. Waterbury (Conn.) Farrel Foundry & Machine Co.

TUBES—Boiler
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Standard Tube Co., The, Detroit.
Steel & Tubes, Inc., Cleveland.

TUBES—Butt
Standard Tube Co., The, Detroit.

TUBES—Copper Alloy
American Brass Co., The, Waterbury, Conn.

TUBES—High Carbon
Standard Tube Co., The, Detroit.
Steel & Tubes, Inc., Cleveland.

TUBES—Low Carbon
Standard Tube Co., The, Detroit.

TUBES—Nickel Silver
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBES—Stainless Steel
Cleveland (Ohio) Tool & Supply Co.

National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Standard Tube Co., The, Detroit.
Steel & Tubes, Inc., Cleveland.

TUBING—Aluminum Seamless
Aluminum Co. of America, Pittsburgh.

TUBING—Forged Seamless
Standard Tube Co., The, Detroit.

TUBING—Hard Rubber
American Hard Rubber Co., 11 Mercer St., N. Y. C.

TUBING—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

TUBING—Nichrome
Standard Tube Co., The, Detroit.
Steel & Tubes, Inc., Cleveland.

TUBING—Open Seam
Standard Tube Co., The, Detroit.
Steel & Tubes, Inc., Cleveland.

TUBING—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila. Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBING—Rubber
Goodrich, B. F. Co., The, Akron, Ohio.

TUBING—Seamless Steel
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Ryerson, Jos. T. & Son, Inc., Chicago.
Standard Tube Co., The, Detroit.
Steel & Tubes, Inc., Cleveland.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBING—Square and Rectangular
Steel & Tubes, Inc., Cleveland.

TUBING—Stainless Steel
Cleveland (Ohio) Tool & Supply Co.
Standard Tube Co., The, Detroit.
Steel & Tubes, Inc., Cleveland.

TUBING—Tinned Brass or Copper
Bundy Tubing Co., Detroit, Mich.

TUBING—Tinned-Steel
Bundy Tubing Co., Detroit, Mich.

TUBING—Tool Steel
Bisset Steel Co., The, Cleveland.

TUBING—Welded Steel
Bundy Tubing Co., Detroit, Mich.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Standard Tube Co., The, Detroit.
Steel & Tubes, Inc., Cleveland.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBULAR PRODUCTS
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Standard Tube Co., The, Detroit.
Steel & Tubes, Inc., Cleveland.

TUMBLING BARRELS—See Barrels—Tumbling

TUNGSTEN—Metals & Alloys
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

TUNGSTEN CARBIDE
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TURBINE-GENERATORS—Steam
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

TURBO-COMPRESSORS
Spencer Turbine Co., Hartford, Conn.

TURNABLES
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

TURNABLES—Industrial
Canton Fdry. & Mch. Co., Cleveland.

TURNING DRILLS
Cleveland (Ohio) Twist Drill Co., The, Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

TYPE—Steel
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

UNIONS
Crane Co., Chicago.

VALVES—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

VALVES—Air Blast for Presses
Littell, F. J., Mch. Co., Chicago.

VALVES—Air & Hydraulic Control
Galland-Henning Mfg. Co., Milwaukee.
Hannibal Mfg. Co., Chicago.

Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

VALVES—Gas, Water and Steam
Crane Co., Chicago.
Jarecki Mfg. Co., Erie, Pa.
Wood, R. D. & Co., Philadelphia.

VALVES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Crane Co., Chicago.
Galland-Henning Mfg. Co., Milwaukee.
Vickers, Inc., 1420 Oakman Blvd., Detroit, Mich.

Wood, R. D. & Co., Philadelphia.

VALVES—Pump, Rubber
Garlock Packing Co., The, Palmyra, N. Y.

VANADIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

VARNISH
Larkin Co., Inc., Buffalo, N. Y.

VARNISH—Acid Resisting
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

VICES
Cincinnati (Ohio) Milling Mch. Co., The, Jarecki Mfg. Co., Erie, Pa.

WASHERS—Iron or Steel
Central Iron & Steel Co., Harrisburg, Pa.

THE BEST KNOWN NAME IN IRON

HANNA

For 70 Years

... foundrymen have recognized Hanna quality as a standard for comparison. Such a reputation is especially significant today, when close adherence to specifications is so important.



THE HANNA FURNACE CORPORATION

MERCHANT PIG IRON DIVISION
OF NATIONAL STEEL CORPORATION

Buffalo Detroit New York Philadelphia Boston

FRANK SAMUEL AND COMPANY, INC.

Swedes Samuel, President

S. A. Cochran, Vice-Pres.

Harrison Bldg. Philadelphia, Pa.

80% FERRO-MANGANESE ELECTROLYTIC
ENGLISH LOW PHOS. PIG IRON FRENCH FOUNDRY

MUCK BARS

LOW PHOS. & STAYBOLT AMERICAN SWEDO IRON CO.'S

MANGANESE ORE

OPEN HEARTH USE BLAST FURNACE USE

IRON ORES

AFRICAN LUMP CHROME ORES SAMCO GROUND

Branch Offices:

14 Alban Rd., Boston, Mass.

26 John St., New York, N. Y.



CHEAPER AND BETTER
PICKLING WITH
RODINE

AMERICAN CHEMICAL PAINT CO.
Ambler, Pa.



WIRE SHAPES

of Every Kind



HINDLEY MFG. CO., Valley Falls, R.I., U.S.A.

WIRE

ROUND—FLAT—HALF ROUND STRAIGHTENED AND CUT SHAPE WIRE

High Carbon Spring
Oil Tempered M.B. and H.B.
Specialize in Tinned Oil Tempered
Low Carbon Basic and Bessemer
Welding Wire Rods and Coils
Sizes 1/2" to No. 40 WM Gauge
(.007)—All Finishes

Wire for Practically All Purposes and Requirements
also SCREEN WIRE CLOTH

Highest Quality and Service Guaranteed

Established 31 Years



The Seneca Wire & Mfg. Company
Fostoria, Ohio

Representatives and Warehouses in practically all principal cities

MUSIC
WIRE

THE WEBB
WIRE WORKS
NEW BRUNSWICK, N.J.

Buffalo WIRE
A BETTER WIRE CLOTH

Constantly improved since 1869
For every Industrial Application
Catalog No. 10K on request

BUFFALO WIRE WORKS CO., INC.
Formerly Scheeler's Sons—Est. 1869
456 Terrace Buffalo, N. Y.

Products Index

WASHERS—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

WASHERS—Lock
American Nut & Bolt Fastener Co., Pittsburgh.

Beall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, Ohio.
Eaton Mfg. Co., Massillon, Ohio.
Heiz & Heiz, Inc., 33-34th St., Brooklyn, N. Y.
Hobbs Mfg. Co., Worcester, Mass.
Houde Engineering Corp., Buffalo, N. Y.
National Lock Washer Co., The, Newark, N. J., and Milwaukee, Wis.
Philadelphia Steel & Wire Corp., Germantown, Philadelphia, Pa.
Positive Lock Washer Co., The, Newark, N. J.
Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.
Washburn Co., The, Worcester, Mass.

WASHERS—Spring
American Nut & Bolt Fastener Co., Pittsburgh.

Beall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, Ohio.
Eaton Mfg. Co., Massillon, Ohio.
Hobbs Mfg. Co., Worcester, Mass.
National Lock Washer Co., The, Newark, N. J., and Milwaukee, Wis.
Philadelphia Steel & Wire Corp., Germantown, Philadelphia, Pa.
Positive Lock Washer Co., The, Newark, N. J.
Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.
Washburn Co., The, Worcester, Mass.

WASHING MACHINES—For Metal Parts
Ranshoff, N. Inc., Cincinnati.

WATER SOFTENERS AND PURIFIERS
Scaife, Wm. B., & Sons, Pgh.

WELDING—Copper Hydrogen Electric
Bundy Tubing Co., Detroit, Mich.

WELDING—Electric
Una Welding, Inc., Cleveland, Ohio.

WELDING—Thermite
Westinghouse Elec. & Mfg. Co., East Pgh.

WELDING—Thermite Corp.
Metal & Thermite Corp., 120 B'way, N. Y. C.

WELDING CONTACTORS
Clark Controller Co., The, Cleveland.

WELDING AND CUTTING MACHINES AND EQUIPMENT—Oxy-Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The., 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

WELDING FIXTURES
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Una Welding, Inc., Cleveland, Ohio.

WELDING MACHINES—Butt
Swift Electric Welder Co., Detroit.

Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Electric Arc
General Electric Co., Schenectady, N. Y.
Greyhound Mfg. Co., 988 Atlantic Ave., Brooklyn, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland.

Una Welding, Inc., Cleveland, Ohio.

Westinghouse Elec. & Mfg. Co., East Pgh.

WELDING MACHINES—Electric Arc Second-Hand. (See Clearing House Section)

WELDING MACHINES—Flash
Swift Electric Welder Co., Detroit.

Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Press
Swift Electric Welder Co., Detroit.

WELDING MACHINES—Spot
Swift Electric Welder Co., Detroit.

Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WHEELS—Rolled Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Standard Steel Wks. Co., Burnham, Pa.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh.

WIRE—Barb
Jones & Laughlin Steel Corp., Pittsburgh.

Pittsburgh (Pa.) Steel Co.

WIRE—Brass, Bronze, Copper, Nickel Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Michigan Wire Cloth Co., 2117 Howard St., Detroit.

Phosphor Bronze Smelting Co., The, Phila.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

Riverside (N. J.) Metal Co.

Seymour (Conn.) Mfg. Co.

WIRE—Electric Heat Resisting
Global Div. The Carborundum Co., Niagara Falls, N. Y.

WIRE—Flat, Round Square or Special Shapes
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Barnes, Wallace Co., The, Bristol, Conn.

Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.

Roebling's, John A., Sons Co., Trenton, N. J.

Seneca Wire & Mfg. Co., The, Fostoria, O.

Wickwire Bros., Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Insulated
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Roebling's, John A., Sons Co., Trenton, N. J.

Simplex Wire & Cable Co., Cambridge A. Boston, Mass.

WIRE—Mattress
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE—Netting
Ludlow-Saylor Wire Co., 600-610 S. Newstead Ave., St. Louis, Mo.

Roebling's, John A., Sons Co., Trenton, N. J.

Wickwire Brothers, Cortland, N. Y.

WIRE—Piano and Music
Prentiss, Geo. W., & Co., Holyoke, Mass.

Webb Wire Works, New Brunswick, N. J.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Special Drawn Shapes
Rathbone, A. B., & J., Palmer, Mass.

WIRE—Spring
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Barnes, Wallace Co., The, Bristol, Conn.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Jones & Laughlin Steel Corp., Pittsburgh.

Pittsburgh (Pa.) Steel Co.

Prentiss, Geo. W., & Co., Holyoke, Mass.

Roebling's, John A., Sons Co., Trenton, N. J.

Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

WIRE—Spring (Muscle)
Webb Wire Works, New Brunswick, N. J.

WIRE—Stainless Steel
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.

Webb Wire Works, New Brunswick, N. J.

WIRE—Steel
Bethlehem (Pa.) Steel Co.

Wickwire Brothers, Cortland, N. Y.

WIRE—Water-proof Rubber Insulated
Simplex Wire & Cable Co., Cambridge A. Boston, Mass.

WIRE—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Lincoln Electric Co., The, Cleveland.

Manganese Steel Forge Co., Phila., Pa.

Maurath, Inc., 7400 Union Ave., Cleveland.

Metal & Thermite Corp., 120 B'way, N. Y. C.

Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.

Pittsburgh (Pa.) Steel Co.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

Roebling's, John A., Sons Co., Trenton, N. J.

Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

Una Welding, Inc., Cleveland, Ohio.

Wickwire Brothers, Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH
Audubon Wire Cloth Corp., Phila., Pa.

Buffalo (N. Y.) Wire Wks. Co., Inc.

Ludlow-Saylor Wire Co., 600-610 S. Newstead Ave., St. Louis, Mo.

Michigan Wire Cloth Co., 2117 Howard St., Detroit, Mich.

Roebling's, John A., Sons Co., Trenton, N. J.

Wickwire Bros., Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE DRAWING MACHINERY—See Wire Mill Machinery & Equip.

WIRE FORMING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.

Manville, E. J., Mch. Co., Waterbury, Ct.

Nilson, A. H., Mch. Co., Bridgeport, Ct.

Sleeper & Hartley, Inc., Worcester, Mass.

WIRE MILL MACHINERY AND EQUIPMENT
Morgan Construction Co., Worcester, Mass.

Sleeper & Hartley, Inc., Worcester, Mass.

Waterbury (Ct.) Farrel Fdry. & Mch. Co.

WIRE NAIL MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE PRODUCTS
American Spring & Mfg. Corp., Holly, Mich.

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Buffalo (N. Y.) Wire Wks. Co., Inc.

Eastern Tool & Mfg. Co., Bloomfield, N. J.

Hindley Mfg. Co., Valley Falls, R. I.

Pittsburgh (Pa.) Steel Co.

U. S. Steel Wire Spring Co., Cleveland, O.

Wickwire Bros., Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Leschen, A., & Sons Rope Co., St. Louis, Mo.

Roebling's, John A., Sons Co., Trenton, N. J.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE FITTINGS
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE STRAIGHTENING AND CUTTING MACHINERY—Automatic
Shuster, F. B., Co., The, New Haven, Ct.

WRENCHES
Armstrong Bros. Tool Co., Chicago.

Williams, J. H., & Co., Buffalo, N. Y.

WRENCHES—Pipe
Greenfield (Mass.) Tap & Die Corp.

WRENCHES—Pneumatic
Ingersoll-Rand Co., 11 Broadway, N. Y. C.

ZINC—SLAB (Spelter)
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ZINC—Strip
Platt Bros. & Co., The, Waterbury, Conn.

ZIRCONIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSOR

1460 cu. ft. Bury Class V.C.C.E., 14"x14"x12"x16", Two Stage, Synchronous Motor Driven. 100 lb. pressure

BENDING ROLLS—PYRAMID TYPE

7' 2" No. 4 Hilles & Jones, Motor Driven, ¾" capacity. Drop end housing
10' McCabe, arranged for motor drive. ½" capacity. Drop end housing. (New)
10' Plate Bending Roll, Motor Driven. ¾" capacity. Drop end housing
24' 6" Hilles & Jones, Motor Driven. Capacity ¾" plate, 24' and 1½" plate, 18'
30' Hilles & Jones, Motor Driven. Capacity to roll up to 1" plate full width
30' Southwark, Motor Driven. Capacity to roll 2" plate. Drop end housing

BORING MILL

52" King, power rapid traverse. Arranged for belted motor drive

CRANES—OVERHEAD ELECTRIC TRAVELING

30 ton 34' 8" span Niles Four 220 volt DC Motors
30 ton 39' span Niles Five 220 volt DC Motors
10 ton 40' span mounted on runway 280' long, Three 220 volt DC Motors
15 ton 45' span Whiting Three 220 volt DC Motors
20 ton 45' span Whiting mounted on runway 170' long, Three 220 volt DC Motors
10 ton 48' 4" span Morgan Three 220 volt DC Motors
10 ton 50' span Niles Motors 220 v., 3 ph., 25c.
15 ton 50' span Shepard Three 220 volt DC Motors
5 ton 50' span Alliance Four 220 volt DC Motors
25 ton 65' span Morgan Four 220 volt DC Motors
40 ton 71' 11" span Niles Four 220 volt DC Motors

CRIMPING MACHINE

Southwark Hydraulic Steel Plate Crimping Press used to start the bend in heavy plate before rolling on the 30' Southwark Bending Roll. Roller feed table for handling plate included.

FORGING MACHINE

2½", 4", 5" Ajax, New Model Machines
3" National, Steel Frame
4" National heavy duty, new model, with overarm header slide. Used less than three months.

HAMMERS—BOARD DROP

2500 lb. Chambersburg, belt driven
3000 lb. Billings & Spencer, Model "D," belt driven

HAMMERS—STEAM DROP

3000 lb. Erie, Double Frame
3000 lb. Chambersburg, Double Frame
5000 lb. Erie, Double Frame
6000 lb. Niles-Bement-Pond, Double Frame
12,000 lb. Chambersburg, Double Frame

HAMMERS—STEAM FORGING

3500 lb. Erie, Single Frame
4000 lb. Chambersburg, Single Frame
5000 lb. Niles-Bement-Pond
6000 lb. Upright, Double Frame
20,000 lb. Chambersburg, Double Frame

LATHE

36"x32" Bridgeford Geared Head Screw Cutting, Motor Driven. Quick Change Gears

LEVELERS

42" Aetna Standard Seventeen Roll, Motor Drive. 2½" dia. rolls
40" Hilles & Jones, Eight Roll, Direct Motor Drive. Capacity ¾" plate
60" Newbold Eleven Roll. Arranged for motor drive. Capacity 3/16" cold mild steel plate

PLANER

102"x126"x28" Detrick & Harvey Convertible, with two rail heads, one side head, auxiliary housing with one head. Direct connected motor drive with electrical equipment

PLANER—PLATE EDGE

36" Hilles & Jones No. 3, Motor Driven. Capacity 2" plate. Pneumatic Hold-down Clamps

PRESSES

No. 268½C Toledo Toggle, 100" Between Uprights. Stroke of Blankholder 22", Stroke of Punch 33"
No. 1818 Toledo Toggle, 60" Between Up-

rights, Stroke of Blankholder 29", Stroke of Punch 42"

No. 412 Bliss Toggle, 86" Between Uprights, Stroke of Blankholder 15", Stroke of Punch 22"

No. 59 Toledo Straight Side Single Crank, 30" Between Uprights, 12" stroke

No. 59½ Toledo Straight Side Single Crank, 40½" Between Housings, 10" stroke

No. 59½ Toledo Straight Side Single Crank, 40" Between Uprights, Stroke 8"

800 ton Hamilton Straight Side Single Crank, 40" Between Uprights, 8" Stroke

PRESSES—TRIMMING

No. 57 Toledo, Geared
No. 78½ Bliss, Geared
No. 74½ Bliss, Belt Driven
No. 56 Toledo, Geared
No. 2½ Billings & Spencer, Fly Wheel Type
No. 3 Billings & Spencer, Geared

PRESS—HYDRAULIC

200 ton Southwark Hydraulic Flanging, Open gap type. Used to flange 84" dia. heads 9/16" plate.

PUNCH & SHEAR

No. 27U Buffalo Universal Punch, Shear & Bar Cutter, arranged for motor drive. Shears plate 1" thick, Angles 6"x6"x¾", Punch 1½" hole thru 1"

No. 7 Ryerson-Kling, arranged for direct motor drive. Punch 1½" thru 1". Shear ¾" plate, 6x1" flat, 4"x4"x½" angles

ROLLS—PLATE STRAIGHTENING

98" Bertsch, seven roll, arranged for geared motor drive. Capacity 1" plate

SHEAR—ANGLE

8"x8"x1" Kling Double Angle Shear, mounted on turn table. Arranged for geared motor drive

SHEAR—GATE

96" Hilles & Jones No. 6, arranged for geared motor drive. Equipped with punching attachment for two rows of 34 each ¼" punches or 100 holes through ¼" plate

STRAIGHTENER

No. 0 Medart, multiple "V" belt drive. Capacity ¼" to 1½" dia. bars any length. Timkenized roll yokes, Timken bearings on motor pinion shaft

RITTERBUSH & COMPANY, INC., 30 CHURCH STREET, NEW YORK, N. Y.

Telephone COrtlandt 7-3437-3438

HIGH GRADE MODERN MACHINES

SHAPERS

1—24" GOULD-EBERHARDT SPD.
2—15" POTTER-JOHNSON, Universal
1—28" COLUMBIA SHAPER
28" GOULD-EBERHARDT Shaper

MILLERS

1—14" PRATT-WHITNEY, Vertical
1—No. 2 KEMPWORTH, Universal
No. 3 BROWN & SHARPE Universal Miller
1—No. 4-A B. & SHARPE, Universal, M.D.
1—No. 3 HENDEY UNIVERSAL

INGERSOLL

Ingersoll Planer type
No. 2 CINCINNATI Vertical Miller
No. 4 CINCINNATI Vertical Miller

LATHES

1—85"x32" BEMENT NILES, Heavy Duty
1—56"x18" N.B-POND, Heavy Duty
1—30"x18" HOUSTON-S-GAMBEL
1—14"x 8" LODGE-SHIPLEY, G.H.
1—16"x10" LODGE-SHIPLEY, G.H.

GRINDERS

1—18"x84" LANDIS, Plain
1—10" NILES Berling Mill
1—No. 24 GARDNER DISC

RADIAL DRILLS

1—5' CINCINNATI BICKFORD

BORING MILLS

1—No. 40 LANDIS, Horizontal
1—100" G. & E. Hobber
1—No. 21 LUCAS, Horizontal
1—No. 1 and No. 2 BARRETT, Horizontal
1—36" BULLARD, Rapid Production
1—31" BAUSCH, Vertical
1—62" NILES, Vertical
1—72" NILES, Vertical
3—30" BETTS, Vertical
1—20" FULASKI, Vertical
5—6" ESPEN LUCAS

PLANERS

1—72"x72"x12" NILES-BEMENT-POND, MD.
1—48"x48"x18" CINCINNATI, M.D.
1—48"x48"x18" SELLERS, Motor Drive
1—48"x48"x14" N.B-POND, Motor Drive
1—22"x42"x22" CINCINNATI, Motor Drive
1—36"x36"x14" GRAY, Motor Drive

GEAR CUTTER

18" GOULD-EBERHARDT Hobber

Ask for current list and catalogue

SIMMONS MACHINE TOOL CORP.

ALBANY, N. Y. New York City, 149 Broadway

Industrial Specials

MILLING MACHINES

No. 5 Cincinnati, High Powered, Rapid Traverse, Plain, Round Overarm, S.P.D.
No. 4 Cincinnati, High Powered, Rapid Traverse, Plain, Round Overarm, S.P.D.
V2 Newton 84" Continuous, Rotary, Motor Driven.

Ingersoll Planer Type Mills, 40"x38"x20" and 36"x24"x20", motor driven.

18" Cincinnati Auto. Duplex.

No. 4-B Heavy Brown & Sharpe Plain, Horizontal, hi-powered, quick return, S.P.D.

GEAR MACHINERY

4—Lee Bradner No. 5-A Gear Hobbers, with high speed attachments.
No. 12 Barber Coleman Gear Hobber.
36" Gould & Eberhart, Roughing.
DeWhitton No. 2 Bevel.

AUTOMATICS

¾" Gridley, 4 spdl., Mod. F.
2¼" Gridley, 4 sp., Mod. F.
2½" Cleveland Model A, spdl. spindle.
G. A. Gray Planer, 72" between housing, 48" under rail, 16" between pockets, 2 heads on cross rail.

Over 500 Metal and Woodworking Machines in Stock.

Send Us Your Inquiries.

INDUSTRIAL MACHINERY COMPANY

2100 Fletcher Avenue

Drexel 3300

Indianapolis, Indiana

DRILL PRESSES

Pratt & Whitney Hvy. Duty 2 spindle, automatic return production drill, with indexing table.

4-Spindle Foote-Burt Rail Drill, No. 4 M.T.

42" Hamilton Universal Radial Drill, M.D.

3-Spindle Barnes, B.G.P.F.S.H.

INTERNAL AND EXTERNAL GRINDERS

No. 12 Terromatic M.D. 3-60-220-440.
No. 52 Hydroll Int. Grinder, Type 52-I-Y-1.

TURRET LATHES

No. 6-A Potter & Johnston.
No. 5-A Potter & Johnston.

PUNCH PRESSES

No. 60 Bliss Reducing Press.
No. DDG-56 Ferracute 16" stroke.
Waterbury-Farrel 1" Thread Roller.

POWER & HAND BRAKES

42", 48", 72", 96", 120" Steel Brakes

VERTICAL TURRET LATHE

36"-44" Niles-Bement-Pond—Equipped with turret head on rail and side head—Motor drive.

SUN MACHINERY COMPANY, INC.

37 Van Buren St., Newark, N. J.

MONARCH

REBUILT TOOLS ARE SOLD ON APPROVAL

MONARCH MACHINERY COMPANY

325 No. 3rd St., Philadelphia, Pa.

HORIZONTAL BORING MILL

No. 35 LANDIS

BORING — DRILLING — MILLING
FLOOR TYPE — MOTOR DRIVE

ROSENKRANZ WEISBECKER & Co., Inc.

149 BROADWAY, N. Y. C.

AUTOMATICS

14" Fay chucking. Motor drive. Serial Nos. 6690, 6460, 5740 and 6095.

CONTINUUMATICS

Two 10" Bullard. Excellent tools. Motor drive.

AIR COMPRESSOR

655", 18"x10"x12" Union class BL two stage. Late type plate valve machine.

RADIAL DRILL

8' Western heavy duty. Motor drive, tapping attachment.

INTERNAL GRINDERS

No. 72-A-3 Heald Sizematic. Also Nos. 70, 72 and 75 Heald. Belt or motor drive.

HAMMER

No. 5, type 1 Nazel pneumatic. Motor drive.

LARGE LATHE

42"x42" Putnam selective geared head, motor drive.

MILL, HORIZONTAL

3 1/2", No. 35 Landis floor type. Motor drive, power rapid traverse.

MILL, VERTICAL

60" Gisholt. Motor drive, power rapid traverse.

PLAIN MILLER

No. 4 Cincinnati, rectangular overarm, intermittent feed, power rapid traverse, motor drive.

UNIVERSAL MILLER

No. 3A motor drive and 3A Heavy single pulley drive Brown & Sharpe.

OPENSIDE PLANER

24"x24"x6" Liberty. Dial feeds, motor drive. Also 48"x36"x10" Liberty and 30"x30"x12" and 36"x36"x18" Cleveland.

SLOTTER

20" Betts heavy duty. Motor drive with power rapid traverse.

UPSETTERS

1" Ajax continuous, auto, roller feed.
1 1/2" Ajax continuous motion.
2 1/2" Acme stop motion.
4" & 5" Ajax stop motion.

**2000 TOOLS IN STOCK
SEND FOR LIST**



AIR COMPRESSOR—Laidlaw-Dunn-Gordon

12"x14" M.D. Duplex Single Stage.

BORING MILL—Cleveland No. 1, 2 1/2" Bar SPD Horiz.

CHUCKING MACHINE—New Britain No. 652 M.D.

DIE SINKER—Keller No. E-3 M.D.

DRILL—Niles 6" Floor Type Univ. Radial

GEAR HOBBERS—Barber-Colman No. 3, No. 12

GRINDERS—B. & S. No. 10, No. 11 Plain

GRINDERS—Cincinnati or Norton No. 1 Tool & Cutter

GRINDER—B. & S. No. 3 Universal.

GRINDER—Persons-Arter 12" Rotary Surface.

GRINDER—Pratt & Whitney 14" B.B. Vert. Surface.

GRINDER—Bath Universal.

GRINDER—Heald No. 70 Internal.

LATHE—Hendey 20"x12", Reed-Prentice 24"x20".

MILLER—B. & S. No. 3B Plain.

MILLER—B. & S. No. 2, No. 3 Vertical.

MILLER—Becker Models B. & C.

MILLERS—Cincinnati No. 2, No. 3, No. 4 Plain.

MILLER—Taylor & Fenn Vertical.

MILLER—Van Norman No. 3 Duplex.

PRESS—Bliss No. 23-250 Ton Knuckle Joint.

SCREW MACHINE—Cone 7 1/2".

SCREW MACHINE—Gridley 7 1/2" Model "G".

SHAPER—G. & E. 24" SPD. M.D. Hi Duty.

SHAPER—P. & W. 10" Vert. M.D.

THREAD ROLLER—W.F. No. 4 Screw.

TURRET LATHE—Bullard 24" New Era, M.D.

TURRET LATHE—J. & L. 3"x36" Steel Head.

BOTWINIK BROS., INC.
MACHINERY
NEW HAVEN, CONNECTICUT

1—3 x 36 J. & L. STEEL HEAD FLAT TURRET LATHE; M.D.

1—5' CINCINNATI-BICKFORD RADIAL DRILL; M.D. thru gear box on base.

1—4' MORRIS ROUND COLUMN RADIAL DRILL; M.D. thru gear box on base.

1—16 x 8 HENDEY GEARED HEAD LATHE; taper attachment.

1—No. 3 THIEL FILING MACHINE.

BUFFALO MACHINERY CO., Inc.

839 Grant Street

Buffalo, N. Y.

REBUILT—GUARANTEED

36" Bullard New Era Type Vertical Turret Lathe
16"x8" Lodge & Shipley Geared Head Lathe, M.D.
20"x10" American Geared Head Lathe, M.D.
18" Cincinnati Duplex Milling Machine, M.D.
No. 5-C Becker Vertical Miller Rotary Table, M.D.
6" American Plain Radial Drill Gear Box, M.D.
22" Barnes All Geared Self Oiling Drill Press, M.D.
16" Smith & Mills Shaper Gear Box, S.P.D. uni. tab.
18"x18"x26" Cincinnati Planer, 4 heads, M.D.
16"x12" Landis Crankshaft Grinder, M.D.
No. 2 Cincinnati Plain HP Milling Machine, M.D.
No. 3-B Milwaukee Plain Miller, D O-A, M.D.
No. 4 Cincinnati Plain Miller, rapid traverse
No. 4 G LeBlond HD Plain Miller, SPD
30 ton Lucas Power Forcing Press
10" 10 Gauge Oil Power Squaring Shear
18" Libby Type A Turret Lathe, M.D.

Send for complete stock list

IROQUOIS MACHINERY CO.

656 Ohio Street

Buffalo, N. Y.

VERY LATE TYPE MACHINES

30' Southwark Bending Rolls, Drop End Housing.
10' Hilles & Jones Bending Roll, Drop End Housing.
32' Hilles & Jones Plate Planer.
7' Bar N.B.P., Floor Boring, Drilling and Milling Machine.
FAILOR-STRAFER MACHINERY CO.
136 Liberty St., New York, N. Y.

30" x 30" x 72"

INGERSOLL MILLER

Complete with DC motor and Controller, adjustable rail.

GANEY MACHINERY CO.

125 Arthur St., Buffalo, N. Y.

HIGH GRADE MACHINE TOOLS

LATHES

20"x10' American Grd. Hd., S.P.D.
36"x14' Boze & Emmes, Quick change Cone Drive, New.
24"x10' Hendey Geared Hd., S.P.D.
24"x10' Bradford Geared Hd., Arr. M.D.
2—36"x30' Lodge & Shipley Selective Geared Head, S.P.D. Two carriages. Like New.
30"x18' Lodge & Shipley Lathe, 3 S.C.D., D.B.G.
27"x20' American High Duty, 3 S.C.D. taper.

GRINDERS

16"x12" Landis Plain, Self Cont.
16"x18" and 72" Landis Crankshaft.
Nos. 50, 55, 60, 65 and 70 Healds.

GEAR CUTTERS

No. 6—60" Brown & Sharpe Gear Cutter.
No. 615 Fellows. 24-H G. & E. Hobber.
18-H Gould & Eberhardt Hobber.
6". 11". 18" Gleason Gear Generators.

BOLT AND PIPE THREADERS

2" Acme Class A Bolt Cutter.
6" Landis Pipe Machine, cone drive.
2" Landis Pipe Machine, cone drive.
1" double spindle Landis Bolt Cutter.
18" Landis Pipe Threader.

BORING MILLS

44" Niles, two heads.
24", 36" & 42" Bullard "New Era" A.C. Motor dr.
60" Niles Boring Mill, 2 heads.

MILLING MACHINES

No. 2 Rockford Universal, complete.
No. 4 Cincinnati Pl. Hi-Power, S.P.D.
No. 3A Brown & Sharpe Univ., S.P.D.
No. 5B Becker Vertical Miller.
No. 4 Cincinnati Univ., S.P.D.
No. 3 Cincinnati High Power Plain, S.P.D.
No. 2 LeBlond H.D. Univ. complete.
No. 3 Kempsmith Universal.

PLANERS

42"x42"x10' Cleveland Open A.C., M.D.
26"x26"x8' Cleveland Openside.

36"x36"x10' Gray, 2 Hds.

RADIAL AND UPRIGHT DRILLS

2 1/2", 3, 3 1/2", 8" Cincinnati, S.P.D.
5"—8" arm American Trindle Purpose, S.P.D.
6" arm American Trindle Purpose, S.P.D.
4" Heavy Duty Fosdick, S.P.D.

SHAPERS

16", 20", 24" G.&E., mtr. dr. thru g.b.
Write for Complete Catalog. We Buy, Sell & Exchange
CINCINNATI MACHINERY & SUPPLY CO.
28 West Second St., Cincinnati, Ohio

ACCUMULATORS, Morgan 8' stroke 2000-lb., Hydraulic 8' stroke, 8" ram.

RAG BALER, 50" x 24" Acme, all-steel construction.

BOLT CUTTER, Acme 1 1/4", belt-dr.

BOLT CUTTER, Landis 3-spdl. 1 1/4" to 1 1/2".

BRAKE, 10-ft. D&K.

COMPRESSOR, Sullivan angle compound class WJ3, with 150 HP. slipring motor, 750 cu. ft.

COAL CRUSHER, Allis Chalmers 12 x 12 roll.

PUMP, Dean vert. triplex hydr. 2 1/4" x 10" 30 GPM @ 2000-lb.

DRAWBENCHES, 15,000-lb. to 50,000-lb.

BOARD DROP HAMMERS, 100-lb. to 1200-lb.

THE ELYRIA BELTING & MACHINERY CO.
ELYRIA, OHIO

UNUSUAL TOOLS

No. 2 Pratt & Whitney Jig Borer

No. 5 Cincinnati Plain Miller Rectangular overarm

3 1/2" Bar Universal Horizontal Boring Mill

No. 4B Kearney & Trecker Vertical Miller

16"x10' Hendey Lathe, Taper attachment.

Wigglesworth Machinery Company
199 Bent St., Cambridge, Mass.

No. 11 1/2, 2 CINCINNATI UNIVERSAL MILLER Cone Drive

No. 3-S CINCINNATI HI-POWER TYPE PLAIN MILLER—Single Pulley Drive

No. 2, 3 CINCINNATI PLAIN MILLERS Cone Drive

No. 0 BROWN & SHARPE AUTOMATICS

No. 3, 12 BARBER COLMAN HOBBERS

No. 6, 9, 12 LEBLOND MULTI CUT LATHES

No. 4, 6 WARNER & SWASEY TURRET LATHES

No. 5-60" BROWN & SHARPE GEAR CUTTER

INDIANAPOLIS MACHINERY & SUPPLY CO., INC.

1960-70 South Meridian Street, Indianapolis, Indiana

VICTOR'S BARGAINS In New Small Tools

High speed and carbon drills, taps, reamers, milling cutters, hollow mills, end mills, drill rod, etc. All made in U. S. A.
Send for our Catalogue.

VICTOR MACHINERY EXCHANGE

251 Centre St., New York, N. Y.

PIPE MACHINES

1 1/2"-2" Landis, belt drive.

1 1/2"-2" Landis, motor drive.

1 1/4"-2" Oster, motor drive.

Rebuilt with regular equipment.

THE O'BRIEN MACHINERY CO.

113 N. THIRD ST., PHILA., PA.

IMMEDIATE DELIVERY

Automatics—Nos. 2 & 2G Brown & Sharpe
No. 6 Brown & Sharpe
Boring Machines, 5" bar, N-B-P Floor Borer
5" Bar Newton Portable
No. 2 Coffman, 3 1/2" bar
No. 36—Rochester Floor 3 1/2" bar
No. 3A Universal, 3" bar
No. 1 Cleveland, 2 1/2" bar
Boring Mills, 24", 36", 42" Bullard "New Era"
30", 42" and 52" King
42" and 48" Colburn
54", 60" Colburn
Drills—1, 2, 3, 4, 6 spdl. Leland-Gifford
1, 2, 3, 6 spdl. Henry & Wright
21" Cincinnati-Bickford
No. 2 Colburn, 1, 2, 3 & 4 spdl.
No. D-4, D-5 & D-7 Colburn
No. 210-1 and 3 spdl. Barnes
No. 12-C Fox Multiple
No. 4 Baush Multiple
Radials—3" Carlton sensitive
4" Fostick sensitive
3" American full univ., M.D.
6" Western Triple Grd.
6" American Triple Purpose
Gear Cutters, Nos. 9-H, 18-H Gould & Eberhardt
No. 16 HSB Gould & Eberhardt
No. 3—52" Pfauter Hobber
No. 6—60" Brown & Sharpe
No. 6—72" Brown & Sharpe
Nos. 6, 62, 65, 7 Fellows
6" Gleason bevel gear
Grinders, Heim Centerless
10"x36", 52" Landis, plain
20"x168" Landis, plain, M.D.
No. 13 B. & S. Univ. Cutter & Tool
No. 4—12"x66" Landis Universal
No. 2 & No. 21/2 Universal (Bath type)
No. 70 Heald Internal
No. 1 1/2 Landis, Internal
No. 25 Heald Rotary Surf.
No. 10 & No. 16 Blanchard, M.D.
No. 16-A Blanchard Surface
15"x17"x6" Norton, O.S. surf. mag. chuck
36"x84" Diamond face, hyd. fd.

MOTOR DRIVE NORTON GRINDERS

6"x32"	10"x96"
10"x18"	14"x36"
10"x24"	14"x50"
10"x36"	14"x72"
10"x50"	16"x50"
10"x72"	18"x96"
18"x120"	

Lathes, No. 3 Lodge & Shipley Duomatic
13"x 8" South Bend, M.D.
14"x 6" American, gr. hd., T.A.
14"x 6" Lodge & Shipley
14"x 8" American
16"x 6", 8" Lodge & Shipley
16"x 8" American, Taper Attach.
18"x 8" Lodge & Shipley, sel. gr. hd., T.A.
18"x10" American gr. hd., T.A.
20"x 8" American gr. hd., T.A.
20"x 8", 14" L. & S. sel. gr. hd.
24"x12" Lodge & Shipley, sel. gr. hd.
26"x12" LeBlond Crankshaft
36"x18" Lodge & Shipley, patent head
36"x30" Rahn-Larmon, gr. head
54"x23" Johnson, triple geared
66"x21", 31", 39" Putnam, triple geared
Millers, No. 0 Brown & Sharpe, plain
No. 2, No. 3, No. 3-S Cincinnati, plain
No. 2-B, No. 3-B, No. 4-B, B. & S., plain
No. 3-B Milwaukee, plain
No. 4 Kempsmith Maxi-Miller, plain
No. 4 and No. 5 Cincinnati, plain
No. 1 1/2, No. 2, No. 2-A B. & S. Universal
No. 3, No. 4 Cincinnati high power, Universal
No. 2, No. 3 Cincinnati, H.P. Vert.
No. 1 1/2, No. 3-B Milwaukee, Vertical
No. 3 Sundstrand Rigidmill
No. 4—36 Cincinnati Hydromatic
No. 5—48 Cincinnati Hydromatic
No. 4 and No. 8 Lees-Bradner Thread
Hanson Whitney Thread Miller
24"x24"x12" Ingersoll Slab
36"x36"x12" Newton Duplex
38"x44"x20" Ingersoll Slab
Planers, 24"x24"x8" American
26" Lynd-Farquhar O.S., planer, shaper
30"x30"x6" and 18" Cincinnati
30"x30"x14" Gray, arr. rev., M.D.
36"x36"x12" and 24" Gray
36"x36"x8" and 18" Cincinnati
36"x36"x14"—24" Cleveland Open Side
42"x42"x30" Niles-Bement-Pond
48"x18"x14" Liberty Open Side
56"x56"x32" Cincinnati, 4 heads
60"x48"x16" Gray, arr. rev., M.D.
60"x48"x20" Hamilton
Presses, No. 106 Bliss Double Crank
No. 96-F Toledo dbl. geared
Shapers, 18" Gould & Eberhardt, M.D.
20" & 24" Gould & Eberhardt
Turret Lathes, No. 4 W.S.S. Univ. Turret Tim. brgs.
No. 1-A Warner & Swasey, A.C. & B.F.
No. 2-A Warner & Swasey
No. 3-A Warner & Swasey
No. 2-B and No. 3-B Foster
No. 4-L Gisholt 9/4" H.S.

**HILL-CLARKE
MACHINERY CO**
647 Washington Blvd. - Chicago

Buy MOREY Machines and Save!

BORING MILLS—Horizontal

UNIVERSAL 2 1/2" bar
CLEVELAND No. 1, 2 1/2" bar
RYERSON No. 12, 4" bar

BORING MILLS—Vertical

BULLARD 24", 42"
NILES BEMENT POND 7-10' Extension
NILES BEMENT POND 10-16' Extension
BETTS 90"
NILES BEMENT POND 51", 2 hds.

PLANERS

CINCINNATI 30"x30"x8"; 4 hds.
AMERICAN 36"x36"x20"; 3 hds.
CINCINNATI 36"x36"x12"; 2 hds.
WOODWARD & POWELL 36"x48"x12"; 3 hds.
NBP 48"x48"x16"; 4 hds.

LATHES

PITTSBURGH 50"x74"; 50"x30", gr. hd.
PITTSBURGH 36"x28", gr. hd.
PUTNAM 50"x30"; 36"x28", gr. hd.
New PUTNAM 36"x28", 3 step cone, DBG.
BRIDGEFORD 36"x60" comb. boring and turning
BRIDGEFORD 36"x60", boring
AMERICAN 36"x21", gr. hd., QCG.
PUTNAM 30-60"x18" Gap
McCABE 26-45"x12", double spindle
McCABE 24-48"x14", double spindle
(and hundreds of other lathes, all sizes)

MILLING MACHINES

INGERSOLL No. 3 combined heavy duty Vert.
INGERSOLL 24"x24"x12", planer type
INGERSOLL 24"x24"x12" slab
NEWTON No. 2 Horiz. and Ver. spdl. keyseat
BROWN & SHARPE No. 4 Universal; cone dr.
BROWN & SHARPE No. 2B Plain
CINCINNATI Nos. 2, 3, 4 Plain
LEES BRADNER No. 4 & No. 6 thread
HANSON & WHITNEY thread
BECKER C-1 and C Vertical

4—BROWN & SHARPE

No. 0 Hand Screw Machines—motor-
drive-in-base—including AC motor.

Late type machines! Practically New!

EACH—\$600.00

DRILL PRESSES

NATCO No. 12, No. 13, No. 22 multiple spdl.
NATCO CII Drill—mechanical feeds
NATCO C13H Drill—hydraulic feeds
PRATT & WHITNEY No. 12; rect. head

DRILLS—RADIAL

CINCINNATI BICKFORD 3'-6" S.P.D.
MORRIS 3 1/2" S.P.D.
DRESES 3" S.P.D.
NBP 8" S.P.D.

GEAR CUTTING EQUIPMENT

BARBER COLMAN Nos. 3 and 12 Gear Hobbers
BROWN & SHARPE No. 34 Gear Hobber
CLEVELAND 8 spdl. Spline Hobber
GLEASON 10" Spiral Bevel Gear
FELLOWS No. 8 B Burnisher
LEES BRADNER Lapper cap. 1 1/4"x8"

GRINDERS

ABRASIVE No. 3 surface
BRYANT No. 3 Internal
HEALD Nos. 50, 55, 60, 65 Intl.
LANDIS 10x24, 10x36, 10x72
LANDIS 20x132 cylindrical
NORTON 14x72, 14x96 Plain Cyl.
NORTON 18x96 Plain Cyl.
NORTON type B81 14x30-36" crankpin
DIAMOND 84" surface
PRATT & WHITNEY No. 14 surface

MISCELLANEOUS

CLEVELAND 2 1/4"-3 1/4" Model "A" Automatic
NATIONAL ACME 1" Cap. Mod. "C" 5 sp. Auto.
CLEVELAND Univ. relieving lathe
TREADWELL 12" pipe mach.
NATIONAL 4" forging mach. steel
HILLES & JONES No. 4 plate bend, roll
MACKENZIE Chip Separator

ask for details

1000 other machines in stock—

**MOREY
MACHINERY CO., INC**
410 BROOME ST. NEW YORK

REBUILT MACHINE TOOLS

ENGINE LATHES

36"x29" Johnson, cone
36"x18" American H.D., cone, taper
36"x11" American H.D., cone
30"x14" Lodge & Shipley, cone
30"x12" Lodge & Shipley, cone
27"x14" American, cone, taper
28—57"x12" Putnam Sliding Bed Extension
Gap
24"x14" Schumacher-Boye, cone
24"x10" American, cone, taper
21"x10" LeBlond Geared Head, taper
27"x14" Lodge & Shipley Patent Head
21"x8" LeBlond Geared Head
20"x8" American, cone
20"x10" Hendey Geared Head, taper
20"x10" Monarch Gap Geared Head
20"x12" Lodge & Shipley Patent Head
18"x10" Lodge & Shipley Patent Head
18"x8" Greaves-Klusman, cone, taper
18"x8" Boye & Emmes, cone
16"x8" Lodge & Shipley Selective Head
16"x6" Hendey Yoke Head, taper, relieving
attach.
14"x8" Reed-Prentice Geared Head

PLANERS

42"x42"x10' Gray, 1 head
36"x14" Liberty, 3 heads, m.d.
36"x36"x10' Niles, 4 heads, m.d.
36"x36"x12" Niles, 4 heads, m.d.
30"x30"x10' Gray, 1 head
33"x33"x8" Ohio, 2 heads
30"x30"x10" American, 1 head
24"x24"x6" Gray, 1 head, m.d.
24" Cincinnati Crank Planer, belt
24" Coulter Openside Crank Planer, belt

SHAPERS

32" Cincinnati, m.d. thru gear box
28" Averbek, s.p.d. thru gear box
28" Ohio, cone
25" Smith & Mills, cone
24" Walcott, cone
24" Queen City, cone
24", 20", Cincinnati, cone
24" Stockbridge, m.d.
20" Walcott, cone

TURRET LATHES, MFG. LATHES

No. 2A, 3A Warner & Swasey Universal, bar
equipment, m.d.
No. 4, 6, 8 Warner & Swasey, cone
3x36" Jones & Lamson, bar equipment
3x36" Jones & Lamson, chucking equipment
2 spindle 3x36" Jones & Lamson, chucking
equipment
Gisholt Simplicmatic, m.d.
21", 24" Gisholt Turret
No. 5A, 6A, 7A Potter & Johnston Automatics,
s.p.d.
No. No. 6C Potter & Johnston Automatics,
m.d.
No. 4, 7 Bardons & Oliver
2 1/2" Acme Flat Turret, cone
No. 9, 12 LeBlond Multi-Cut Lathes
No. 12 LeBlond Heavy Duty Automatic Crank-
shaft Lathe, m.d.
3 1/2"x60" Lo Swing Lathe, m.d.
22"x5" Monarch Geared Head Mfg. Lathe
21"x10" LeBlond Mfg. Lathe

MULTIPLE DRILLS

No. 10C Natco Multiple, m.d., 40 spindles
No. 10H Natco Hydraulic, m.d., 24 spindles
No. 13H Natco Hydraulic, m.d., 24 spindles
No. 13 Natco, m.d.
No. 30 Natco, m.d.
No. 18 Natco, m.d.
No. 216, 220 Baker 2 spindle Drills
No. 25 Baush Multiple, m.d.
No. 26C Fox Multiple
No. 7D Moline Hole Hog 2 spindle Cylinder
Borer
No. 2 Baush Multiple
No. 1 Pratt & Whitney 2 spindle Gun
8 spindle Allen H.S. Ball Bearing, m.d.
6 spindle No. 1 Avey-Matic H.S. B.B.
6 spindle 21" Hoefler Gang
6 spindle National Acme Semi-Automatic Hori-
zontal
6 spindle No. 3 Avey
6 spindle No. 2 Avey
6 spindle No. 1 1/2 Avey H.S. B.B.
5 spindle Detroit Semi-Automatic Horizontal
4 spindle No. 4 Foote-Burt H.D.
4 spindle No. 2 Foote-Burt H.D.
4 spindle Henry & Wright H.S. B.B.
4 spindle No. 2 Fostick, power feed
4 spindle 22" Barnes All Geared Self-Oiling
4 spindle No. 2 Avey-Matic
4 spindle No. 3 Avey
3 spindle 22" Rockford Gang
3 spindle Hoefler 22" Gang
2 spindle Leland & Gifford, direct m.d.
2 spindle Leland & Gifford, belt
2 spindle Allen, belt, 12" overhang
2 spindle No. 1 Avey

Write for Complete Stock List
THE EASTERN MACHINERY CO.
3263 SPRING GROVE AVE., CINCINNATI, OHIO.

SPECIALS

No. 3½ Baker heavy duty Keyseater, belt drive.
 No. 4 LeBlond plain milling machine.
 No. 2 Hendey-Norton universal milling machine.
 Model C Becker vertical mill, rotary table, M.D.
 No. 14 Pratt & Whitney vertical surface grinder.
 No. 33 Abrasive vertical surface grinder, with magnetic chuck.
 No. 2 Brown & Sharpe universal grinder, with universal equipment.
 5—Bridgeport 7½ h.p., h.d., m.d., snagging grinders.
 No. 416 Baker heavy duty drill press.
 20—Hand screw machines from 1 to 6.
 2—14" x 8" bed American all geared head motor driven engine lathes with taper attachments.
 14" x 10" Hendey all geared head motor driven engine lathes with taper attachment.
 18" x 10" Hendey geared head M.D. lathe.
 18" x 8" Monarch H.D. A.C. engine lathe.
 16" x 8" Hendey geared head M.D. lathe.
 14" x 19" Fay Automatic Lathe.
 26" Universal combination planer and shaper, M.D.
 No. 26 Williams & White Bulldozer.
 2—No. 1 Lees-Bradner production gear hobbers.
 2—Landis ½" double head bolt threaders.
 48 x 48 x 10" Cincinnati H.D. double housing planer.
The Above Are But a Few Picked at Random From Over 750 Machines in Stock. Let Us Quote on Your Requirements.
RIVERSIDE MACHINERY DEPOT
 251 St. Aubin Detroit, Mich.

UNUSUAL BUYS

GRINDER, No. 2 BROWN & SHARPE UNIV.
 GRINDER, No. 3 Abrasive Surface, M.D.
 GRINDER, No. 33 Abrasive Surface, M.D.
 GRINDERS, 72" Head, M.D., Hyd. Feed. (3)
 GRINDER, Heim Centerless, M.D.
 HOBBER, No. 16HS Gould & Eberhardt, S.P.D.
 LATHE, 16"x6" Lodge & Shipley, M.D.
 MILL, 2½" Cleveland Boring, B.M.D.
 NIBBLER, No. 236 Gray, B.M.D.
 PLANER, 36"x36"x12" Liberty Openside, M.D., 3 Heads
 PLANER, 30"x30"x10" Liberty Openside, Motor driven with Motor, 1 Rail Head and 1 Side Head
 PRESS, No. 66 Bliss Consol., S.S., S.C.
 PRESS, 50 ton Heny & Wright, M.D.
 SHEAR, 10', ¼" United Eng'g, M.D.
 SHEAR, 10', ¾" Pittsburgh, M.D.
 SLOTTER, 16" Betts, M.D., like new, latest type
And a complete stock of up-to-date rebuilt equipment.

HARVEY GOLDMAN & CO.
 Machinery
 10567 Gratiot Ave., Detroit, Mich.

Main 6390 Market 5026

Plants Dismantled Bought - Sold

Machine Tools—Machinery
 Power Equipment
 Woodworking Machinery
 Steam Boilers
If not in Stock—We'll get it
ADELPHIA EQUIPMENT COMPANY
 341 N. 3rd St., Philadelphia, Pa.

CAN MAKING MACHINERY

Bliss No. 5
Toggle Press
 can be seen in operation
R. & S. MACHINERY CO.
 19 Howard St., N. Y. C.

Engle and Niagara Metal Washing Machines
 Artes Type CS-1C Automatic Measuring, Cutting and Stripping Machine
 McKenzie Chip Separator
 42" Standard Rotary Board Cutter
 No. 201½ V&O Threading and Trimming Machines
 No. 1½ Avey 2-Spindle Drill
 2-Spindle Leland & Gifford 12" H. S. Drill

J. N. MOYER

471 North Fifth St. Philadelphia, Pa.

A FEW NEW ITEMS IN STOCK

JACKSON DIE SINKER, with **CHERRYING ATT.** No. 5.
KNIGHT No. 2 Vertical Miller; Univ.; arr. M.D.
HEAD No. 80 Internal Grinder.
CINCINNATI No. 1 Universal Miller; Vert. Att., Dividing Heads; etc.
NORTON 14" x 54" Plain Grinder.
BECKER No. 5-C Vertical Miller, Belt Drive.
BRIDGEFORD Lathes, 26" x 14", Geared Head, Taper Att.; Q.C.G., Motor Drive.
 Radial Drill N.B.P. Universal, Motor Drive.
PRATT & WHITNEY 6" Vertical Shaper.
 Serial No. 400—Model B.
KEMPSMITH No. 33 Maxi-Miller; Arr. M.D.
FALK MILL SUPPLY CO., INC.
 NEW ADDRESS: 18 Ward St., Rochester, N. Y.

BLISS PRESS No. 310-78½ DOUBLE GEARED

Twin drive; Tie rod construction; Automatic Friction Clutch mounted between uprights. (No outboard bearings.) Safety Buttons; Farvall one shot lubricating system. Bearings 10-in., Stroke 10-in. Area bed bolster 36 in. x 35 in. Area slide face F to B, R to L, 30 in. x 28 in. Shut height to bed 36 in. Bolster 7 in. Good condition. Can be inspected under power.

Wm. J. ALLES
 63 W. Milwaukee, Detroit, Mich.

Blanchard Grinder

Number 16—26 in. chuck. Motor 220 V., 3 P., 60 C. Serial over 1900.
MORRIS MACHINERY CO.
 99 Chestnut St. Newark, N. J.

#31 Lucas Hor. Boring Mill

table type, 3" Bar, Single Pulley drive, complete with Rotary table and Vertical Milling Attachment.
KAMIS MACHINERY CO.
 3rd AND MOORE STS.
 Howard 8474 Philadelphia, Pa. Main 4607

PRESS
NO. DD 201 FERRACUTE DOUBLE ACTION TOGGLE PRESS, 200 TON, TWIN GEAR, FRICTION CLUTCH DRIVE. 24" stroke of plunger, 32" between columns, 7½"—9 crankshaft. Weight 58,500 lbs. Excellent Condition. Priced Low Before Moving.
GEO. M. BERNSTEIN & CO.
 15 S. Clinton St., Chicago, Ill.

GRINDERS
 No. 24 Gardner Horizontal Disc Grinder, 53" vertical spindle.
 84" Diamond Face Grinder, 30" segmented wheel, Motor Drive.
EXCELLENT BUYS
"Over 2,000 Machines in stock"
INTERSTATE MACHINERY CO., INC.
 129 S. Clinton St., Chicago, Ill.
 (Free Parking)

OPENSIDE PLANER
72" x 60" x 18" DETRICK & HARVEY
 3 HEADS MOTOR DRIVE
ROSENKRANZ, WEISBECKER & CO., INC.
 149 BROADWAY, N. Y. C.

FOR SALE
1—No. 1½ C Bliss Stamp- ing Press, side geared, with 5-H. P. Motor.
 The J. F. W. Dorman Company, Inc.
 528-528 North Calvert Street, Baltimore, Maryland

Quick Sales

If there's a market for the items of used machinery you have on hand—THE IRON AGE will find it.

Manufacturers scrutinize these Clearing House pages closely each week. Frequently they send telegrams or put in long distance phone calls—thus effecting sales for the advertiser immediately.

List your items as completely as possible, in THE IRON AGE, and you improve your chances of making satisfactory sales.

No. 8—Buffalo "Armor Plate" Bar Cutter—95% new.
11' Stoll Motor Driven Power Shear—capacity 14 Ga.
24" x 12' Lodge & Shipley Crank—Shaft Lathe.
30" x 30" x 10' Cleveland Open Side Planer, 3 heads.
48" x 48" x 12' Cleveland Open Side Planer, 2 heads.
Ingersoll Miller, 56" x 36" x 10', 4 heads.
No. 5-A Lees-Bradner Gear Generator.
No. 1/2—Buffalo "Universal" Iron Worker.

THE E. L. ESSLEY MACHINERY CO.
829 Rees Street, Chicago, Ill.

POWER PRESSES

BLISS, TOLEDO, V & O, ETC.
REBUILT—GUARANTEED

JOSEPH HYMAN & SONS

Troga, Livingston and Almond Streets
Philadelphia, Pa.

PRICED RIGHT FOR QUICK SALE

1 No. 1 Standard Mch. Plain Drop Press—max. stroke 54", length of uprights 72"
1 No. 3 Standard Plain Drop Press—max. stroke 50" distance between uprights 16"
1 1500 Lb. Massillon Drop Board Hammer, 8' uprights—48" fall

SCULLY-JONES & COMPANY

1911 S. Rockwell St., Chicago, Ill.

ALL TYPES AND MAKES

POWER PRESSES MACHINE TOOLS

IF ITS MACHINERY WE HAVE IT

NATIONAL MACHINERY EXCHANGE

128-138 Mott St. New York, N. Y.

1—Pels Type CLUA 21 sp. High Throat Single End Punching Machine; size of Throat 24"x19"
1—Sheppard Pinch Bug Riveter Type 805—Reach 20" Gap 18"

apply American Stadium Co.
Foot Pine St., Jersey City, New Jersey

Angle Shear, 6"x6"x3/4" Cleveland, double, on turntable, arr. for MD.

Bulldozer, No. 9 Williams-White, 24" stroke, crosshead 16x89 1/4", est. 70,000 lbs.

Reliance Machinery Sales Company
1403 Brighton Place, N.S., Pittsburgh, Pa.

FOR SALE—One left hand Wheland roller bearing No. 22 band mill, one Wheland left hand carriage, 36" opening, one right hand Prescott carriage, 54" opening, one Wheland twin steam engine 15 x 18 300 H.P., one twin H.S.G. engine, 18 x 22", one circular steel lattice 10 ton derrick with hoisting engine. Address W. E. NICKY, 469 Goodwyn Ave., Memphis, Tennessee.

ARC WELDERS

1000 Amp. G.E. 5 man arc welder AC motor
300 Amp. Lincoln arc welder AC motor
300 Amp. Lincoln arc welder DC motor
200 Amp. Lincoln arc welder AC motor
200-300-400-750 Amp. Transformer welders

GOODMAN ELECTRIC MACHINERY CO.

1060 Broad Street, Newark, N. J.

Rebuilt PUMPS
Specialists in Pump Rebuilding. Completely remanufactured to your requirements. Guaranteed or your money back. LOW PRICES. Large stock all sizes. We buy, sell, and exchange. **THE MOTOR REPAIR & MFG. CO.** 1553 Hamilton Ave., Cleveland, O.

STEAM TURBINES

60 CYCLE

1—7500 KW., Gen. Elec. 3 ph., 12,000 V., 1800 RPM. with 16,000 sq. ft. Worthington surface condenser.
1—5000 KW. Gen. Elec. 3 ph., 2300/4000 V., 1800 RPM. with surface or jet condenser.
1—2000 KW. Gen. Elec. 3 ph., 2300 volt, 3600 RPM. condensing type.
1—1500 KW. Gen. Elec. 3 ph., 2300 V., 3600 RPM. with Westinghouse surface condenser.
1—750 KW. All. Chal. 3 ph., 2300 V., 3600 RPM. with C. H. Wheeler surface condenser.

40 CYCLE

1—1000 KW. Westgh. geared type C.W. No. 16, 3 ph., 600 volts with surface or jet condenser.

25 CYCLE

1—7500 KW. Gen. Elec. 3 ph., 9000 V., 1500 RPM. with 16,000 sq. ft. surface condenser.

SURFACE CONDENSERS

1—16,000 sq. ft. Worthington surface condenser.
1—10,000 sq. ft. Worthington surface condenser.
1—8,000 sq. ft. Wheeler Condenser & Engr. Co.
1—4,000 sq. ft. Wheeler Condenser & Engr. Co.
1—3,300 sq. ft. C. H. Wheeler.
1—2,500 sq. ft. Westinghouse.
1—2,500 sq. ft. C. H. Wheeler.

BOILERS

4—1250 H.P. Babcock & Wilcox Water Tube, Straight Tube, Cross Drum 240 lb. pressure, with B. & W. chain grate stokers, B. & W. Superheaters and Fuel Economizers.

ARCHER & BALDWIN, INC.

75 WEST STREET, NEW YORK, N. Y.

Tel.—BOWling Green 9-9275-9276.

Slipring & Squirrel Cage Motors

220 H.P. Cr. Wh., 720 RPM.
150 H.P. G. E. 1K, 720 RPM.
100 H.P. All. Chal. AR, 1800
100 H.P. Wagner 1200 RPM.
100 H.P. West. CS, 720 RPM.
100 H.P. West. CS, 900 RPM.
75 H.P. Gen. Elec. 1K, 450 RPM.
75 H.P. Gen. Elec. 1M, 600 RPM.
75 H.P. Gen. Elec. MT, 900 RPM.
75 H.P. Gen. Elec. MT, 1200
50 H.P. West. CW, 1200 RPM.
50/20 H.P. Wagner, 2 speed slip-
ring, 250/900 RPM
12—30/15 H.P. Gen. Elec., 2
speed slipring, 400/1200 RPM

"MOTORLAND" SELECTIONS

Partial Listing

Synchronous Motors

350 H.P. Ridgeway, 900 RPM.
187 H.P. Gen. Elec., 900 RPM.
175 H.P. Gen. Elec., 600 RPM.
125 H.P. Elec. Machy., 1800 RPM.

L. J. LAND

140 Grand St., N. Y. City, N. Y.
Established 1910

NEW YORK CITY'S LARGEST STOCK

Generators

5000 ampere World Plater
30 KVA West. A.C. Motor Generator, Generator single phase; Motor, 3 phase
30 K.W. Elec. Dyn., 600 volt, 30 ampere Motor Generator Set
25 K.W. 375/500 volt, 3 unit Motor Generator
12 1/2 K.W. 750/1000 volt, 3 unit Motor Generator
40 K.W. Gen. Elec. 38/64 volt Generator, 885/515 amperes
100 K.W. Gen. Elec., 3 bearing, 125 volt, synchronous M.G. Set

230 Volt D.C. Motors

150 H.P. Gen. Elec. type RC36, 1750 RPM.
2—100 H.P. West. SK, 625 RPM.
3—75 H.P. Elec. Dyn., 400 RPM.
75 H.P. West. SK, 850 RPM.

AIR COMPRESSORS

New and Remanufactured

Compressor Builders for 35 Years

In Stock at Our Plant—150 Modern Compressors

All Makes and Sizes—Shop Tested—Guaranteed

AMERICAN AIR COMPRESSOR CORP.

558 Hamilton Avenue, Brooklyn, New York

AIR COMPRESSORS

Ing.-Rand 1245 ft. and 450 ft.
Sullivan 583 cu. ft.

CLAMSHELL BUCKETS

3/4, 1, 1 1/4 yd.

J. T. WALSH

Brisbane Bldg. Buffalo, N. Y.

MODERN

AIR COMPRESSORS

All Types and Sizes

Rebuilt-Guaranteed

EARL E. KNOX COMPANY

8 East 5th St. Erie, Pa.

ADJUSTABLE SPEED

MOTORS—230 V. D. C.

H.P.	Make	Type	Speed
1—1500	West.	151 B	470/600
1—250/410	Cr. Wh.	DMC	1000/1200
2—150	G. E.		1000/1200
2—120	G. E.		300/750
1—75	G. E.	RF 17A	300/900
5—60	El. Dy.	25 B	525/1050
1—40/50	Cr. Wh.	EM	175/700
1—35	Cr. Wh.	CMC	800/1600
12—25	West.	SK-110L	450/2200
2—20	West.	SK-130	375/1500
20—10	West.	SK-90	500/1500
25—7 1/2	West.	SK-70	400/1600
1—5 1/2	West.	SK	600/1800
10—3 1/2	West.	SK-40	450/1800
15—3 1/2	West.	SK-30	450/1800

BELYEA COMPANY, Incorporated
147 West 18th St., New York City

D. C. MOTOR

230-volt, d. c., variable speed 80 to 100 h.p., 550 to 1100 r.p.m., in service less than 6 months, offered at low price. Has second geared 7 1/2 h.p. motor. Common base and drive gearing complete with control board for push-button operation. Suitable printing press or other uses.

Box 427 Equity.

113 West 42nd St., New York City.

AIR COMPRESSORS IN STOCK

1050 ft. Ingersoll-Rand XCB, Belted.
807 ft. Ingersoll-Rand XCB, Belted.
676 ft. Ingersoll-Rand XCB, Belted.
540 ft. Ingersoll-Rand EB1, 12x10, Belted.
9 Low Pres., 168 ft., 710 ft., 1200 ft., 2200 ft., Steam, Belted & Elec. Drives.

R. C. STANHOPE, INC.

875 Sixth Ave. New York, N. Y.

40 K.V.A. 3-80-240 C.W. alternator
9 K.W. 3-80-240 G. E. alternator connected to gasoline engine
75 H.P., 220 volt, D.C., 1200 R.P.M. C.W. motor
Crane motors, 220 volt, D.C., 5-100 H.P.
120 H.P., 220 volt, D.C., 725 R.P.M. West. motor
We rewind lifting magnets and buy burned out magnets.
Goodman Electric Machinery Co.
1060 Broad St. Newark, N. J.

SLIP RING MOTORS
 40 HP. 900, 3/60/440 volt General Electric MT
 75 HP. 900, 3/60/220 volt Westinghouse CW
 100 HP. 720, 3/60/220 volt Westinghouse CW

SYNCHRONOUS MOTORS
 60 HP. 900, 3/60/440 V General Electric TS
 100 HP. 1200, 3/60/220 V General Electric ATI

AC GENERATORS
 37 KVA. 1800, 3/60/220 Ideal-belted exciter
 50 KVA. 1200, 3/60/440 Bullock-dir. con. exciter
 100 KW. 600, 3/60/440 Western Electric

ARC WELDERS
 200 Amp. Gen. Elec. 3/60/220 motor-portable
 400 Amp. Lincoln belted type with control

VOLTAGE REGULATOR
 General Electric type TA-125, form F3 complete

TUBINES
 60 KW. 3/60/240 V. GE-Kerr non-condensing
 100 KW. 3/60/480 V. Gen. Elec. non-condensing

AIR COMPRESSORS
 5x4, 7x6, 12x10 Ingersoll-Rand class ER-1

PLATING GENERATORS
 300 Amp. motor driven—800 Amp. 6/12 volt belted

ROCKFORD ELECTRIC EQUIPMENT CO.
 715 South Wyman St. Rockford, Illinois

1—Baker Electric Tractor Crane
 12' boom—3000 lb. capacity
 1—Clark 3 Wheel "Dumpror"
 1 1/2 yd. Dump Body
 2—McCormack-Deering Model 20"
 Industrial R. T. Tractors
 15—3/4 to 1 1/2 yd. Clam Shell Buckets
 4—Koehler 1 1/2 K. W. comb.
 Generator and Comp. Units
RENTAL SERVICE CO., INC.
 2001 Venango St., Philadelphia, Pa.

SURPLUS MACHINERY AND MOTORS

H.P.	Speed	Volts	Make	Price
2-400 3 ph.	60 cy.	500	2200 Westinghouse	\$1,000
1-450 3 ph.	60 cy.	514	550 G.E.	S.R. 1,150
1-15 D.C.	500/1000	550 G.E.		290
2-20 D.C.	500/1000	550 G.E.		340
1-No. 6 Quickwork Shear,			D. C. Motor 30	
H.P. 48" Throat, 1" metal				2,500
1-Rock River Punch, 48" Throat, Archite-			tural Jaw. Price	850
1-15-Ton Morgan Crane, 68' Span				
2-15-Ton Morgan Crane, 52' Span				
1-5-Ton Universal Crane, 1/4 yard Williams			Bucket, Gas Driven Motor, mounted on	
White Truck				3,500
1-50-Ton Industrial Bay City Wreck Crane				4,500
1-20-Ton Browning Loco. Crane				4,000
1-20-Ton Industrial Bay City Loco. Crane				3,500
1-35-Ton McMyler Loco. Crane				4,500

HUNTER STEEL COMPANY
 3200 Grand Avenue Phone Federal 4300
 Neville Island Pittsburgh, Penna.

EXCEPTIONAL USED EQUIPMENT
 1—15-ton, 57' span Overhead Crane, 3 Motors for 440 V. 3-ph. 60-cy. current; Cage Control, excellent condition.
 1—17 1/2-ton Cap. type EA INDUSTRIAL Crane, 8 wheel, standard gauge, with 50' boom, 4290 series, steam operated. In good operating condition. Very reasonable.
 1—5-ton Cap. 56" 6" span P&H Crane with 2-3-ton trolleys; Cage Control, 22-V. 3-ph. 60-cy. Year 1927.
F. E. Bauer Jr. Co. 30 Church St. New York

LOCOMOTIVE CRANE
 For Sale—Industrial Brownhoist, 25 ton, eight wheel locomotive crane. A.S.M.E. boiler, fifty foot boom. In use less than two years. Condition excellent.
P. A. HENAU
 2140 Book Bldg. Detroit, Michigan

ELECTRIC HOISTS—CRANES
 Bought — Sold — Rented
ELECTRIC HOIST & MOTOR CO.
 149 N. 9th ST. BROOKLYN, N. Y.

OVERHEAD CRANES AND HOISTS
 1—5-ton P. & H. crane, 3-motor, 94' 0" span, 220 volts D.C. with 200' of outside runway.
 1—3-ton P. & H. crane, 28' 6" span, 220 vo., 3 ph., 60 cy., cage controlled or floor control.
 2—2-ton Shepard & LoHed cranes, 2-motor, 33' 0" span, 220 vo., 3 ph., 60 cy.
 2—35-ton Morgan Girders, 58' 6" span.
 2—2-ton Shepard hoists, push trolley, 220 vo., D.C. or A.C.
 Send Me Your Crane & Hoist Inquiries.
JAMES P. ARMEL, 925 Fulton Bldg., Pittsburgh, Pa.

An unusual offering! 6 1/2 yard MINING or STRIPPING SHOVEL
 Buysrue 320-B, 2200/4000 volt, 3 ph., 60 cycle, A.C.—250 volt D.C. Ward-Leonard control. 90 ft. boom and 58 ft. dipper stick. Built 1925 and used only two years. Very good condition.
 Located near Madisonville, Ky.
 Part cash terms if necessary.
IRON & STEEL PRODUCTS, INC. Railway Exchange Chicago, Ill.
 "Anything so long as it contains IRON or STEEL" Phone: HARRison 0163

GENERAL PLANT EQUIPMENT
PRESSED STEEL CAR CO.,
 PLANT, NORTH SIDE,
 PITTSBURGH, PA.

Steel Buildings
 Overhead Electric Cranes
 Punches
 Lathes
 Planers
 Boring Mills
 Plate Shears
 Forging Headers
 Forging Hammers
 Presses

UNITED IRON & METAL CO.
 9th and Bingham Streets
 PITTSBURGH, PA.
 Phone—Hemlock 3900

CAN YOU USE OVERHEAD TRAVELING CRANES?

1—10 ton P&H (High Speed) D.C. 58' Span
 1—10 ton SHAW A.C. 38' 8" Span
 1—20 ton P&H D.C. 51' Span
 1—25 ton WHITING D.C. 41' 2" Span
 1—100 ton SHAW A.C. 69' 9" Span
 Also, a lot of A.C. General-Electric Brand New Crane Motors, Brakes and Controllers. 20 H.P., 25 H.P., 40 H.P., and 50 H.P.
 Do you have any good used Overhead Cranes?
 Send full specifications on your surpluses.

IRON AND STEEL PRODUCTS, Inc.
 RAILWAY EXCHANGE, CHICAGO, ILL.
 "Anything so long as it contains Iron or Steel"

CRANES AND DERRICKS
 1—Type "J" 35 ton cap. McMyler steam Loco. Crane, railroad type.
 1—17 ton cap. Link Belt gasoline crawler Crane, 60' boom.
 1—20 ton cap. Brownhoist elec. oper. Loco. Crane, 8 wheel railroad type.
 3—50 ton Steel Derricks, 100' booms, 111' masts, complete with guys.
PHILIP T. KING, "The Crane Man"
 50 Church St., New York, N. Y.

OVERHEAD ELECTRIC TRAVELING CRANES
 5-ton Northern 45' 0" span, 220-V.A.C.
 7 1/2-ton P&H 65' 0" span, 230-V.D.C.
 (224' outdoor steel runway 26' high)
 20-ton Cleveland 70' 0" span, 220-V.A.C.
 20-ton Shepard 70' 0" span, 230-V.D.C.
 35-ton P&H 38' 4" span, 230-V.D.C.
 62 1/2-K.W. 230-V.D.C. Northwestern motor generator set.
T. B. MacCABE CO.
 3701 No. Broad St., Philadelphia, Pa.

NEED HELP in technical or business problems? McGraw-Hill Books bring you the experience of experts in your field. The latest complete McGraw-Hill Catalogue is a guide to up-to-date books that give the facts and experience you need. Describes more than 1500 volumes, by leading minds in business, industry, and research. Explains Free Examination and Budget Book-buying Plans. Send name, address, and occupation for your FREE COPY today. **G. F. Wiley, McGraw-Hill Book Co., Inc.**, 330 W. 42nd St., New York City.



18 GAUGE BLUE ANNEALED STEEL SHEETS
In Random Sizes
 30" and wider 60" and longer
 good clean stock
80 TONS
 Located New York City
 Write, telegraph, telephone
 best offers
STERLING STRIP STEEL CORP.
 90 White St., New York, N. Y.
 Telephone Canal 6-1705-1706

STEEL DUMP CARS
 AIR OPERATED
 Four—30-yd. Clark, built 1924 & 25
 Three—30-yd. Western, built 1929
 Eight—20-yd. Western, built 1929
 Four—10-yd. Western, built 1927
 In unusually good condition.
IRON & STEEL PRODUCTS, INC.
 Railway Exchange Chicago
 "Anything so long as it contains IRON or STEEL"

EQUIPMENT
 26—12 yd. Western Air or Hand Dump Cars
 11—50 ton 40 ft. Flat Cars
 8—50 ton 40 ft. Steel Gondolas
 22—50 ton Steel Hopper Coal Cars
 1—25 ton Browning Locomotive Crane
 1—20 ton Ohio Locomotive Crane
 2—40 ton Baldwin 4-Driver S.T. Locomotives
 12—5 yd. 36" ga. Western Dump Cars
 3—1 1/2 yd. 36" ga. Koppel V Dump Cars
 Cars and Locomotives of all types.

HYMAN-MICHAELS CO.
 20 N. Wacker Drive Bldg., Chicago
 Ry. Exchange Bldg. 101 West 31st St.
 St. Louis, Mo. New York

"Anything so long as it contains IRON or STEEL"
IRON & STEEL PRODUCTS, INC.
 Railway Exchange, Chicago, Ill.
CARS and LOCOMOTIVES
CAR REPAIR PARTS
 Before you buy
 Compare our prices with new.
 Why spend one dollar when fifty cents will suffice?

ALBERT & DAVIDSON PIPE CORP.
PIPE
 NEW—USED—UNTESTED
 2nd Ave. 50th-51st St. EST. 1904 Brooklyn, N.Y.

Second Hand Overhauled
 Wrought Iron Pipe Rethreaded
 and Steel Coupled
PIPE
 All Sizes in Stock
Greenpoint Iron & Pipe Co., Inc.
 Stagg & Bogart Sts., Brooklyn, N. Y.

RAILS "1 Ton or 1000"
 NEW RAILS—5000 tons—All Sections—All Sizes.
 RELAYING RAILS—25,000 tons—All Sections—All Sizes, practically as good as New.
 ACCESSORIES—Every Track Accessory carried in stock—Angle and Splice Bars, Bolts, Nuts, Frog Switches, Tie Plates.
 Buy from One Source—Save Time and Money.
 Phone, Write or Wire.
L. B. FOSTER COMPANY, Inc.
 PITTSBURGH NEW YORK CHICAGO

Immediate shipment, 100,000 feet of 20 lb. portable track. Also all sections light and heavy relaying rail, spikes, bolts, frogs and switches.
M. K. FRANK
 480 Lexington Ave., New York City 450 Fourth Avenue, Pittsburgh, Penna.

WANTED

WANTED

WANTED

"WANTED TO BUY"

1/2" Cap. Bullblock
1/2" Wire Straightener
Swager, 1/2" solid
Draw Bench, cap. 3" bars
Bar Straightener
Burnishing Machine

ADDRESS BOX S-86

Care The Iron Age, 239 W. 39th St., New York

MIDLAND STEEL & EQUIPMENT CO.

400 South Clinton Street, Chicago, Illinois

**The
Largest Buyers
of
Surplus Steel Inventories**

WE BUY

SURPLUS or OBSOLETE
MACHINE and CARRIAGE BOLTS
NUTS—RIVETS—WASHERS

Also MILD STEEL BARS or CROP ENDS

MARQUETTE SUPPLY COMPANY
8220-30 Burnham Ave., Chicago, Illinois

WANTED

Surplus and obsolete sizes

All steel products

Sheets Strip Steel

Bars Plates any quantity

Expert Liquidators

ADDRESS BOX R-850

Care The Iron Age, 239 W. 39th St., N. Y. C.

WANTED
5 ton CRANE approxi-
mately 60' span with struc-
tural steel work.

Address Box S-69

Care The Iron Age, 239 W. 39 St., New York

**LOCOMOTIVE CRANES
HYDRAULIC BALING PRESSES
ALLIGATOR SHEARS**

IRON & STEEL PRODUCTS, Inc.
Railway Exchange Chicago
"Anything so long as it contains IRON or STEEL"

**SURPLUS and OBSOLETE
STEEL INVENTORIES
PURCHASED**

immediate acceptance

ALLIED SUPPLY COMPANY
12285 Schaefer Rd. Detroit, Mich.

STEEL BUILDINGS

& STRUCTURES

ANY SIZE OR LOCATION
ALSO PLANTS AND EQUIPMENT

Are you in the market for any Buildings?
"Anything so long as it contains Iron or Steel"

IRON & STEEL PRODUCTS, Inc.
Railway Exchange, Chicago

CONTRACT MANUFACTURING

WE CAN DO IT FOR YOU

We have a Light and Heavy
Machine Shop. Pattern Shop.
Sheet-Metal Shop. Electric
Welders. Wood-Working Ma-
chinery. Ample Assembly
Space. B. & M. Ry. Siding.

What would you like to
have made?

NATIONAL EQUIPMENT CO.
SPRINGFIELD, MASS.

NEED

MACHINE WORK?

An old company with new modern
equipment will do machine work or
build assembled machines for you on
contract.

Over 100 years manufacturing expe-
rience and yet up-to-date in factory
equipment and methods. Submit
specifications for an estimate.

GIFFORD-WOOD CO.
Hudson, N. Y.

METAL STAMPINGS IN SMALL LOTS

We now have the largest plant in the
United States devoted exclusively to the
production of metal stampings in small
lots. We also have the most modern
equipment and do first class short run
stampings at the lowest possible price.
Prompt service is assured on all releases.

Send Us Your Inquiries

W. S. RYAN CO.

4363 Woodward Ave.

Detroit, Mich.

**San Francisco Bay District man-
ufacturer** making own line mining ma-
chinery wants additional work in machine
shop, foundry, welding and plating depart-
ments. Also act as Pacific Coast distributors
if desired. Will make attractive proposition.

ADDRESS BOX R-989

Care The Iron Age, 239 W. 39th St., New York

STAMPINGS

Light and Medium
Electric Spot Welding and
Assembled Units

We specialize in designing stampings to substi-
tute castings. Dies designed and built for
quantity production.

Eastern Tool & Stamping Co., Inc.,
39 Ballard Street, Saugus, Mass.

HOT DIP GALVANIZING

We have the largest hot dip galvanizing
plant and kettles in the United States.
We have the most modern equipment
to do first class galvanizing at lowest
prices. Prime Western Zinc used exclu-
sively. Galvanized products furnished.

Send Us Your Inquiries

Joseph P. Cattie & Brothers
Gaul and Letterly Streets
Philadelphia

SCREW MACHINE PRODUCTS

OF EVERY DESCRIPTION
SMALLEST UP TO 2 1/4"

HARDWARE SPECIALTIES

OLSON MFG. CO.
Worcester, Mass.

LET US QUOTE YOU

on light and medium punching and
stamping; Up-to-date tool room,
automatic plating; large and small
automatic upright and draw presses.

LYNN BUCKLE MFG. CO.
733 Washington St., Lynn, Mass.
Tel. Breakers 2599

Just tell them what you can do

It is not necessary here in the Con-
tract Manufacturing Section to use
large space or big display type. That
is not necessary for when a man is
looking for someone to make the parts
or machines he needs he will find your
advertisement if it is here.

The main thing is to be here regu-
larly, to make your facilities clear to
tell enough about your service so
that you will get a chance to bid on
what he wants done.

STAMPINGS

Medium and Small Sizes
Up to date equipment for large or
small production.

ESMCO AUTO PRODUCTS CORP.
Bush Terminal Bldg. No. 7
Brooklyn, N. Y.

BRASS AND BRONZE CASTINGS

1 lb. to 4000 lbs.
Capacity 16,000 lbs. per day

OUR SPECIALTIES

WORM AND GEAR BRONZE, BRIDGE
BRONZE, ACID PROOF BRONZE,
BRONZTOX BUSHINGS AND BARS.
A. W. CADMAN MFG. CO., Pittsburgh, Pa.
Established 1860

MONEL AND PURE NICKEL

CASTINGS

Superior Bronze Corporation
ERIE, PENNA.

BRASS, BRONZE AND ALUMINUM CASTINGS

ALLOY IRON CASTINGS

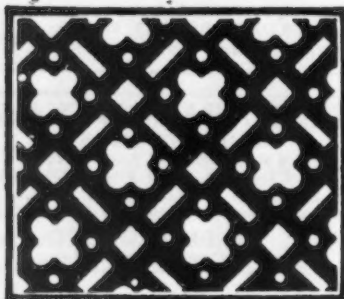
a specialty

CONTRACT MACHINE WORK
requiring large machine tools

MURRAY IRON WORKS COMPANY
BURLINGTON, IOWA

PERFORATED PLATES

Agents Wanted



PIÉTOCO S. A.
Sclessin Belgium

Procurement Division, Public Buildings Branch, Washington, D. C., March 5, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., April 7, 1937, for construction of the U. S. P. O. at Fairfield, Maine. Upon application, one set of drawings and specifications will be supplied free to each General Contractor interested in submitting a proposal. The above drawings and specifications **MUST** be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of \$5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to Contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any Sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch.

Procurement Division, Public Buildings Branch, Washington, D. C., March 4, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., April 2, 1937, for construction of the U. S. P. O. at Larchmont, N. Y. Upon application, one set of drawings and specifications will be supplied free to each General Contractor interested in submitting a proposal. The above drawings and specifications **MUST** be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of \$5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to Contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any Sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch.

ATTENTION MANUFACTURERS NEW PROCESSES AND NEW MACHINERY FOR NEW OR EXISTING MARKETS

A successful consulting mechanical engineer for over twenty years for leading New England manufacturers is expanding his office moderately and wishes to add a few new accounts. A specialist in developing new processes and new machinery, reducing costs of manufacture or reducing problems to practical solutions. Large or small machinery.

This notice is not intended as an advertisement but simply as a means of establishing contact with interested leading manufacturers having problems their organizations may not be equipt to readily handle.

A conference may be arranged without cost for discussion of any problem requiring urgent or extensive attention. Fees very moderate.

ADDRESS BOX S-64

Care The Iron Age, 239 W. 39th St., New York, N. Y.

PLANT REQUIRED 10" Merchant Rolling Mill

Belgian rougher or other layout of recent design, details electric drive, mechanical features, layout capacity, also tackle and rolls available. Separate price mill, rolls, motors and controls. State when and where, delivery available, also age, condition and where inspection could be made.

ADDRESS BOX S-90

Care The Iron Age, 239 W. 39th St., New York

FORGINGS

Old established sales organization would like to contact concern that has surplus capacity to produce small and medium hammered machinery forgings.

ADDRESS BOX S-49

Care The Iron Age, 239 W. 39th St., New York

*Rates for
Help and Situation
Wanted Ads*

HELP WANTED RATES

Set solid, minimum 50 words	\$5.00
Each additional word	10c
All capitals, minimum 50 words	\$6.50
Each additional word	13c
All capitals, leaded, minimum 50 words	\$7.50
Each additional word	15c

SITUATION WANTED RATES

Set Solid, minimum 25 words	\$1.00
Each additional word	4c
All capitals, minimum 25 words	\$1.75
Each additional word	7c
All capitals, leaded, minimum 25 words	\$2.50
Each additional word	10c

COUNT SEVEN WORDS FOR KEYED ADDRESS

DISPLAY ADVERTISING RATES GIVEN ON REQUEST

DO NOT SEND ORIGINAL LETTERS of recommendation in replying to advertisements—duplicates will answer the purpose. Letters forwarded without charge.

EMPLOYMENT EXCHANGE

EMPLOYMENT SERVICE

SALARIED POSITIONS \$2,500 to \$25,000

This thoroughly organized advertising service of 27 years' recognized standing and reputation carries on preliminary negotiations for positions of the calibre indicated, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by a refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If you have actually earned over \$2,500, send only name and address for details.

R. W. BIXBY, Inc.
274 Delward Bldg., Buffalo, N. Y.

HIGH GRADE MEN

Qualified candidates desiring salaried positions are invited to use our individual and confidential services in contacting responsible employers. We negotiate all preliminary overtures.

Established 1915
THE NATIONAL BUSINESS BOURSE
H. H. Harrison, Director
20 W. Jackson Blvd., Chicago

DESIGNERS AND DRAFTSMEN—We have immediate need for 20 men on steel mill and furnace design—Interviews Chicago or East—\$225 to \$325 mo.; also 5 men on structural and piping for large power plant program—\$200 to \$300—2 to 4 years work in sight. Many other demands for experienced men. Write for application; no registration charge. Confidential. Established 22 years. Harrison Personnel Service, 20 W. Jackson Blvd., Chicago.

HELP WANTED

PLANT SUPERINTENDENT — MASTER MECHANIC

Capable taking complete charge of maintenance and mechanical operation of large Middle West metal goods plant. Actual practical experience as master mechanic and full knowledge dies, welding, stamping and lithographing is essential. Write in confidence giving complete information on past experience, age, references, salary expected.

ADDRESS BOX S-25
Care The Iron Age, 239 W. 39th St., New York

ENGINEER DRAFTSMAN capable of designing modern hydraulic presses with pumping units by growing manufacturer within 400 miles of East coast. Good pay, excellent opportunity to advance and good living conditions. Give full details of experience, earnings and other personal information in first letter. Address Box S-88, care The Iron Age, 239 W. 39th St., New York.

FOREMAN: for CASTING and ROLLING of non-ferrous plates. Familiar with melting and casting of non-ferrous metals. Rolling mill experience of advantage but not essential. Reply with full experience particulars. Address Box S-83, care The Iron Age, 239 W. 39th St., New York.

THE IRON AGE has an opening in its editorial staff for a young man (not over 35) with experience in writing; preferably a college graduate in mechanical engineering or metallurgy, who has had practical work in steel or metal-working industries. Address Editor, THE IRON AGE, 239 W. 39th Street, New York.

SALES ENGINEER to obtain orders for a modern machine shop, equipped to manufacture medium size machinery. Commission basis. Address Box S-84, care The Iron Age, 239 W. 39th St., New York.

WANTED: TOOL STEEL SALESMAN Experienced preferred. Address Box S-68, care The Iron Age, 239 W. 39th St., New York.

SITUATIONS WANTED

ELECTRIC TUBE WELDING ENGINEER. EXPERIENCED REGARDING PATENT CONDITIONS, THEORY OF WELDING, WELDER AND FORMER DESIGN. SAVE TIME AND COST OF DEVELOPING ENGINEERS TO STUDY INVOLVED PROBLEMS WHICH REQUIRE ACTUAL EXPERIENCE. USE YOUR HOT AND COLD MILL PRODUCTS. AVOID MISTAKES OF OTHERS. AVOID ROYALTIES IF POSSIBLE. ADDRESS BOX S-52, CARE THE IRON AGE, 239 W. 39TH ST., NEW YORK.

ROLLING MILL SUPERINTENDENT. 30 YEARS EXPERIENCE BLOOMING AND STRUCTURAL MILLS, SHAPES, FLATS, ROUNDS, SQUARES, PILING BARS, ALLOY AND STAINLESS STEELS. NOW EMPLOYED BY CORPORATION, NOT SATISFIED ACCOUNT CHANGE IN MANAGEMENT. ENTERTAIN WESTERN AGENCY MILL SUPPLIES, TOOLS, ETC. BEST OF REFERENCES. ADDRESS BOX NO. 7619-A, CARE THE IRON AGE, 802 OTIS BLDG., CHICAGO.

SUCCESSFUL INDUSTRIAL MERCHANT seeks connection as advertising, sales promotion, publicity or sales manager with well-managed industrial concern. 18 years' experience selling and advertising steel, non-ferrous metals, machinery, fences, instruments. U. S. Naval Academy education. Plenty of initiative, tireless worker, dependable producer. Address Box S-55, care The Iron Age, 239 W. 39th St., New York.

BALTIMORE-WASHINGTON. MANUFACTURERS' REPRESENTATIVE, established, with office, metallurgist; thoroly mill, technical customer-contact and sales experienced in about all steel mill products except tool steels; especially experienced in Sheets, Tin Plate and Pipe; equipped to take good mill account and give it proper attention. Address Box S-74, care The Iron Age, 239 W. 39th St., New York.

MANUFACTURERS' REPRESENTATIVES operating Detroit, Michigan and northwestern Ohio, with very best of long standing contacts, desire additional lines—malleable, grey iron or die castings, rubber or synthetic mouldings, wire, sheets, bars or plates. Correspondence solicited. Address Box S-40, care The Iron Age, 239 W. 39th St. New York.

SALES ORGANIZATION WITH REPRESENTATIVES in key cities covering Middle Atlantic and Central states contacting manufacturers with mill supply specialties will add 1 additional line. Contacting Master Mechanics and Maintenance Engineers. Bank and business references. Address H. C. Woodside, 508 Chestnut Street, N. S. Pittsburgh, Pa.

CENTRIFUGAL PUMP ENGINEER, of Phillipsburg, N. J., unusually Qualified by experience. Accustomed to full responsibility. Design, testing, recommendations, engineering data. Desires responsible position. If you anticipate any vacancies, write now for full particulars. Address Box S-82, care The Iron Age, 239 W. 39th St., New York.

INDUSTRIAL EXECUTIVE. Profit-minded foundry executive, age 39; for 20 years keen analytical student of foundry problems, including sales, costs, production and personnel. Possessed of initiative, energy, and pleasing personality, with record of accomplishment. Address Box A-920, care The Iron Age, 428 Park Bldg., Pittsburgh, Pa.

POSITION WANTED: Twenty years' construction and industrial experience. Inspection and supervision, building construction, and maintenance, steam power house operation, storekeeping, appraisals, fixed capital accounting. Single, go any place. Address Box S-51, care The Iron Age, 239 W. 39th St., New York.

STEEL FOUNDRY EXECUTIVE—Metallurgical engineer, M.Sc., 14 years' experience in the Iron and Steel industry; control, technical service, development and research. Only a position requiring ability desired. Age 37. Address Box S-38, care The Iron Age, 239 W. 39th St., New York.

SITUATIONS WANTED

INDUSTRIAL EXECUTIVE; broad experience in plant management, mechanical field, practical mechanic, thoroughly versed in modern methods, tools, materials. Excellent organizer, capable executive. Location immaterial. Address Box S-41, care The Iron Age, 239 W. 39th St., New York.

PERSONNEL EXECUTIVE THOROUGHLY EXPERIENCED IN ALL PHASES OF INDUSTRIAL RELATIONS IN STEEL, AUTOMOTIVE AND ALLIED INDUSTRIES. IMPRESSIVE RECORD. ADDRESS BOX S-71, CARE THE IRON AGE, 239 W. 39TH ST., NEW YORK.

CHICAGO DISTRICT REPRESENTATIVE—Knowledge of manufacturing, machining, castings, foundries, forgings, press work. Know territory intimately. Educated—Healthy—Active. Address Box No. 7618-A, care The Iron Age, 802 Otis Bldg., Chicago.

MANUFACTURERS REPRESENTATIVE in metropolitan district for high carbon flat annealed and tempered spring steels. Thoroughly familiar with manufacturers requirements. Address Box S-80, care The Iron Age, 239 W. 39th St., New York.

SALES MANAGER or REPRESENTATIVE for STEEL WAREHOUSE or MILL covering New York and New Jersey area. Twelve years selling complete line New York City for large warehouse. Address Box S-85, care The Iron Age, 239 W. 39th St., New York.

YOUNG LADY BOOKKEEPER-ACCOUNTANT, twelve years' experience manufacturing and foundry work, costs, payroll and purchasing, desires permanent position with sound reputable firm. References. Address Box S-67, care The Iron Age, 239 W. 39th St., New York.

PRODUCTION: MAN 35 years of age, 18 years' experience, ROLLER, FOREMAN. Graduate of Industrial & Personnel Management with engineering training. An exceptional man. Address Box S-42, care The Iron Age, 239 W. 39th St., New York.

ST. LOUIS REPRESENTATIVE calling on utilities, petroleum and chemical industries offers intensive coverage to manufacturers and equipment builders and desires additional lines for this trade. Address Box S-91, care The Iron Age, 239 W. 39th St., New York.

PURCHASING EXECUTIVE with cold rolled specialty mill experience thoroughly familiar with selling and pricing all high carbon flat annealed and tempered spring steels. Address Box S-79, care The Iron Age, 239 W. 39th St., New York.

MANAGER, SUPERINTENDENT or similar seasoned executive, varied experience. Any mechanical line, record of results. Credentials of a high order. Address Box S-58, care The Iron Age, 239 W. 39th St., New York.

SUPERINTENDENT OR FOREMAN would like to secure position in rolling mill. Unlimited experience in shape rolling. Reference furnished. Address Box S-77, care The Iron Age, 239 W. 39th St., New York.

WELDING ENGINEER—Expert on fabrication. Able to design and build. Welding machinery for intricate work. Address Box C-1044, care The Iron Age, 621 Union Bldg., Cleveland, Ohio.

POSITION WANTED. Merchant bar roller 25 years' experience iron, steel, copper. Familiar construction and installation. References. Address Box S-81, care The Iron Age, 239 W. 39th St., New York.

ADVERTISERS INDEX

A

Adelphia Equipment Co..... 148
 Alan Wood Steel Co..... 66
 Albert & Davidson Pipe Corp... 150
 Alles, Wm. J. 148
 Allied Supply Co..... 151
 American Air Compressor Corp... 149
 American Blower Corp..... 123
 American Chemical Paint Co.... 143
 American Cutting Alloys, Inc.... 132
 American Foundry Equipment Co. 83
 American Gas Furnace Co..... 139
 American Hammered Piston Ring
 Div. of Koppers Co.....10-11
 American Hollow Boring Co..... 132
 American Monorail Co., The.... 61
 American Rolling Mill Co..... 18
 American Spring & Mfg. Corp... 141
 American Stadium Co..... 149
 American Welding & Mfg. Co.... 133
 Ames, W., & Co..... 126
 Archer & Baldwin, Inc..... 149
 Armel, James P..... 150
 Armstrong-Blum Mfg. Co..... 75
 Armstrong Bros. Tool Co..... 74
 Athenia Steel Co., The..... 126
 Atlas Car & Mfg. Co., The..... 68

B

Baird Machine Co., The..... 127
 Bardons & Oliver..... 130
 Bartlett, C. O., & Snow Co.... 63
 Bartlett Hayward Div. of Koppers
 Co.....10-11
 Bauer, F. E., Jr., Co..... 150
 Beatty Machine & Mfg. Co.... 130
 Belmont Iron Works..... 137
 Belyea Co., Inc..... 149
 Bennett-Raffin Machinery Corp. 146
 Bernstein, Geo. M., & Co..... 148
 Bethlehem Steel Co..... 26
 Bissett Steel Co., The..... 74
 Bixby, R. W., Inc..... 153
 Bliss & Laughlin, Inc..... 69
 Botwinik Bros., Inc..... 146
 Bradley, C. O., & Son, Inc.... 138
 Brassert, H. A., & Co..... 136
 Buffalo Mchry. Co., Inc..... 146
 Buffalo Wire Wks. Co., Inc.... 144
 Business Opportunities Section.. 152

C

Cadman, A. W., Mfg. Co..... 151
 Canton Fdry. & Mch. Co..... 135
 Carborundum Co., The..... 16
 Carnegie-Illinois Steel Corp.... 8-9
 Cattie, Joseph P., & Bros..... 151
 Champion Sheet Metal Co., Inc.. 134
 Cheney, S., & Son..... 134
 Chicago Perforating Co..... 138
 Chicago Rawhide Mfg. Co..... 4
 Cincinnati Blackford Tool Co.... 62
 Cincinnati Machinery & Supply
 Co..... 146
 Cincinnati Shaper Co..... 107
 Clark Bros. Bolt Co..... 67
 Clearing House Section.....145-150
 Cleveland Cap Screw Co., The.. 83
 Cleveland-Cliffs Iron Co., The.. 14
 Cleveland Steel Tool Co..... 130
 Cleveland Tool & Supply Co., The 132
 Climax Molybdenum Co..... 118
 Columbia Steel Co..... 8-9
 Conco Engineering Works..... 135
 Cone Automatic Mach. Co., Inc.. 129
 Contract Manufacturing Section.. 151
 Crosby Co., The..... 127
 Crucible Steel Castings Co.... 133
 Curtis Pneumatic Machinery Co.. 125

D

Detroit Hoist & Machine Co.... 135
 Donahue Steel Prods. Co., Inc.. 151
 Dorman, J. F. W., Co., Inc., The 148
 Drels & Krump Mfg. Co..... 131
 Dunbar Bros. Co., Div. of Asso-
 ciated Spring Corp..... 141

E

Earle Gear & Mach. Co..... 136
 ESMCO Auto Prods. Corp. 151

Eastern Gas & Fuel Associates.10-11
 Eastern Machine Screw Corp.,
 The 130
 Eastern Mchry. Co., The..... 147
 Eastern Tool & Stpg. Co., Inc.. 151
 Electric Hoist & Motor Co.... 150
 Electro Metallurgical Co..... 21
 Elyria Belting & Mchry. Co., The 146
 Employment Exchange, Section.. 153
 Engineering & Construction Div.
 of Koppers Co.....10-11
 Erie Foundry Co..... 70
 Espen-Lucas Mach. Wks., The.. 129
 Essley, E. L., Mchry. Co., The.. 149

F

Fallor-Strafer Mchry. Corp. 146
 Falk Mill Supply Co., Inc. 148
 Flexrock Co..... 142
 Flinn & Dreffeln Co..... 137
 Foote Gear Wks., Inc..... 136
 Foster, L. B., Co., Inc..... 150
 Frank, M. K..... 150

G

Ganey Mchry. Co..... 146
 Gas & Coke Div. of Koppers Co.10-11
 Gibson, Wm. D., Co., Div. of As-
 sociated Spring Corp..... 141
 Gifford-Wood Co..... 151
 Goldman, Harvey, & Co..... 148
 Goodman Electric Mchry. Co.... 149
 Goodrich, B. F., Co..... 7
 Goss & DeLeeuw Mch. Co., The. 129
 Great Lakes Steel Corp..... 6
 Greenpoint Iron & Pipe Co., Inc. 150
 Greyhound Mfg. Co..... 139
 Griffin Mfg. Co., Inc..... 132

H

Hanna Furnace Corp., The..... 143
 Harrington & King Perforating
 Co., The 75
 Hartford Drop Forge Co., The.. 133
 Hassall, John, Inc..... 140
 Hayward Co., The..... 135
 Henault, Philip A., Co..... 150
 Hendrick Mfg. Co.....138, 140
 Hill-Clarke Mchry. Co..... 147
 Hindley Mfg. Co..... 143
 Hunter Steel Co..... 150
 Huntington Laboratories, The.... 71
 Hyde Park Fdry. & Mach. Co.... 140
 Hyman, Joseph, & Sons..... 149
 Hyman-Michaels Co..... 150

I

Indianapolis Mchry. & Supply
 Co., Inc..... 146
 Industrial Machinery Corp..... 145
 Industrial Steel Casting Co.... 133
 Inland Steel Co..... 23
 Interstate Mchry. Co..... 148
 Iron & Steel Prods., Inc.....150, 151
 Iroquois Machinery Co..... 146

J

Jessop Steel Co..... 111

K

Kamis Mchry. Co..... 148
 King, Philip T..... 150
 Knox, Earl E., Co..... 149
 Koppers Co.....10-11
 Koppers Coal Co., The.....10-11
 Koppers-Rheolaveur Co.....10-11

L

Laclede Steel Co..... 131
 Lamson & Sessions Co., The.112, 113
 Land, L. J..... 149
 Landis Machine Co., Inc..... 24
 Lansing Stamping Co..... 134
 Latrobe Electric Steel Co..... 131
 Lee Spring Co., Inc..... 126
 Leland-Gifford Co..... 129
 Leschen, A., & Sons Rope Co... 79
 Lincoln Electric Co..... 117
 Lizars, Rawson & Co..... 125
 Lucas Mch. Tool Co., The..... 129

Ludlum Steel Co..... 3
 Lynn Buckle Mfg. Co..... 151

M

McGraw-Hill Book Co..... 150
 MacCabe, T. B..... 150
 Macklin Co..... 116
 Malleable Iron Fittings Co.... 134
 Manhattan Rubber Mfg. Div. of
 Raybestos-Manhattan, Inc., The 119
 Marquette Supply Co..... 151
 Merrell Mfg. Co..... 129
 Michigan Wire Cloth Co..... 126
 Midland Steel & Equip. Co.... 151
 Miles Mchry. Co..... 146
 Milne, A., & Co..... 80
 Monarch Machinery Co..... 145
 Morey Mchry. Co., Inc..... 147
 Morris Mchry. Co..... 148
 Motor Repair & Mfg. Co..... 149
 Moyer, J. N..... 148
 Mundt, Chas., & Sons..... 138
 Murray Iron Wks. Co..... 151

N

National Business Bourse..... 153
 National Equipment Co..... 151
 National Machinery Exchange.. 149
 National Steel Corp.....6, 143
 New Albany Machine Mfg. Co.... 130
 Nickey, W. E..... 149
 Nilson, A. H., Mch. Co..... 137
 Northern Engineering Wks..... 78

O

O'Brien Mchry. Co., The..... 146
 Ohio Locomotive Crane Co., The 135
 Olson Mfg. Co..... 151
 Ottemiller, Wm. H., Co., Inc... 140

P

Parker-Kalon Corp..... 140
 Perkins, B. F., & Son, Inc..... 72
 Phosphor Bronze Smelting Co.,
 The 2
 Pietoco, S. A..... 152
 Pittsburgh Crushed Steel Co.... 139
 Pittsburgh Lecomelt Furnace
 Corp..... 139
 Poor & Co., Canton Forge & Axle
 Works 133
 Pratt & Whitney Div. Niles-Be-
 ment-Pond Co..... 56
 Progressive Mfg. Co., The..... 126

Q

Quigley Co., Inc..... 142

R

R. & S. Machinery Co..... 148
 Reliance Electric & Engineering
 Co.....12-13
 Reliance Mchry. Sales Co..... 149
 Rental Service Co., Inc..... 150
 Republic Steel Co..... 1
 Ridgway, Craig, & Son Co.... 135
 Ritterbush & Co., Inc..... 145
 Riverside Mchry. Depot..... 148
 Robbins & Myers, Inc..... 136
 Rockford Drop Forge Co..... 133
 Rockford Electric Equip. Co.... 150
 Roebling's, John A., Sons Co.... 19
 Rosenkranz, Weisbecker & Co.,
 Inc.....145, 146 & 148
 Roxalin Flexible Lacquer Co.,
 Inc..... 73
 Ryan, W. S., Co..... 151
 Ryerson, Jos. T., & Son, Inc... 132

S

Samuel, Frank, & Co., Inc..... 143
 Scaife, Wm. B., & Sons Co.... 137
 Screw Machine Products Corp.. 140
 Scully-Jones & Co..... 149
 Seneca Wire & Mfg. Co., The.. 144
 Sheet Metal Specialty Co..... 135
 Sheffield Gage Corp..... 65
 Sherwin-Williams Co..... 121
 Simmons Mch. Tool Corp..... 145
 Simonds Mfg. Co., The..... 136

Standard Oil Co. (Indiana).... 156
 Standard Pressed Steel Co.... 140
 Stanhope, R. C., Inc..... 149
 Stanley Works, The..... 131
 Stearns Magnetic Mfg. Co..... 76
 Steel & Tubes, Inc..... 15
 Sterling Strip Steel Corp..... 150
 Strand, N. A., & Co..... 130
 Sun Machinery Co..... 145
 Superior Bronze Corp..... 151
 Superior Steel Corp..... 59
 Swift Electric Welder Co..... 79

T

Taft-Peirce Mfg. Co..... 77
 Tar & Chemical Div. of Koppers
 Co.....10-11
 Thomas Spacing Machine Co.... 139
 Thomson-Gibb Elec. Welding Co. 139
 Timken Roller Bearing Co..... 155
 Titanium Alloy Mfg. Co..... 120
 Tomkins-Johnson Co., The..... 80
 Torrington Co., The..... 137
 Treasury Department 152

U

Union Carbide & Carbon Corp... 21
 United Engineering & Foundry
 Co..... 20
 United Iron & Metal Co..... 150
 U. S. Steel Corp. Subsidiaries... 8-9
 U. S. Steel Products Co..... 8-9
 U. S. Steel Wire Spring Co.... 141

V

V & O Press Co., The..... 131
 Veeder-Root, Inc..... 140
 Victor Machinery Exchange..... 146

W

Waldron, John, Corp..... 136
 Walsh, J. T..... 149
 Wanted Section 151
 Warner & Swasey Co..... 6
 Waterbury Farrel Foundry &
 Machine Co..... 22
 Webb Wire Wks., The..... 144
 Weldit Acetylene Co..... 82
 Western Gas Div. of Koppers
 Co.....10-11
 Wetherell Bros. Co..... 132
 White Tar Co. of New Jersey,
 Inc., The10-11
 Whiting Corp..... 135
 Wickwire Spencer Steel Co.... 78
 Wigglesworth Mchry. Co..... 146
 Wood Preserving Corp., The...10-11
 Worcester Stamped Metal Co.... 134
 Worthington Pump & Machinery
 Corp..... 124
 Wyckoff Drawn Steel Co..... 81

Y

Youngstown Sheet & Tube Co.,
 The 17

Z

Zeh & Hahnemann Co..... 131

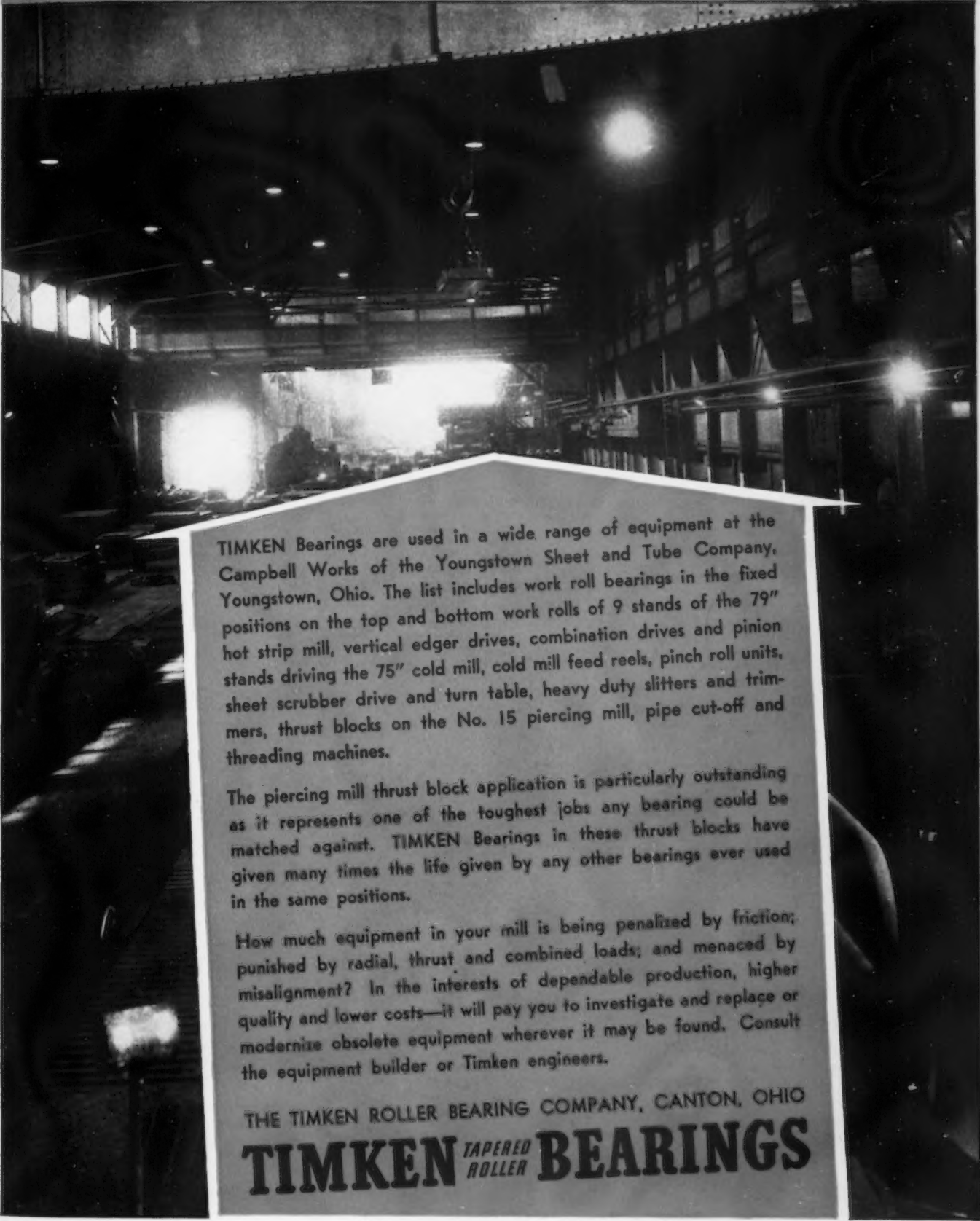
CLASSIFIED SECTION

Business Opportunities 152
 Clearing House145-150
 Contract Manufacturing 151
 Employment Exchange 153
 Wanted 151

New Industrial Literature..... 115

TIMKEN BEARINGS AT CAMPBELL WORKS

THE YOUNGSTOWN SHEET AND TUBE COMPANY



TIMKEN Bearings are used in a wide range of equipment at the Campbell Works of the Youngstown Sheet and Tube Company, Youngstown, Ohio. The list includes work roll bearings in the fixed positions on the top and bottom work rolls of 9 stands of the 79" hot strip mill, vertical edger drives, combination drives and pinion stands driving the 75" cold mill, cold mill feed reels, pinch roll units, sheet scrubber drive and turn table, heavy duty slitters and trimmers, thrust blocks on the No. 15 piercing mill, pipe cut-off and threading machines.

The piercing mill thrust block application is particularly outstanding as it represents one of the toughest jobs any bearing could be matched against. TIMKEN Bearings in these thrust blocks have given many times the life given by any other bearings ever used in the same positions.

How much equipment in your mill is being penalized by friction; punished by radial, thrust and combined loads; and menaced by misalignment? In the interests of dependable production, higher quality and lower costs—it will pay you to investigate and replace or modernize obsolete equipment wherever it may be found. Consult the equipment builder or Timken engineers.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN TAPERED ROLLER BEARINGS

**RIGHT DOWN
YOUR ALLEY**



STANORUST
Stops Valve Rusting
in Storage

A large manufacturer of valves was having considerable difficulty with rusting of finished parts in storage although the valves were wrapped in wax paper before storage. Several rust preventatives were tried, including heavy oils and other anti-rust products, without success until Stanorust was suggested. Now, even after long periods of storage the valves are free from rust.

Seven grades of Stanorust provide a product for practically all services. Five grades may be applied by spraying. Practically every metal working plant can use one or more grades of Stanorust to advantage. A Standard Lubrication Engineer will be glad to advise you if you have difficulties with rusting of equipment or products.

Other Standard Oil (Indiana) cost-saving lubricants for the Metal Working field include:

PREMIER CUTTING OIL
ACME CUTTING OIL
SUPERLA SOLUBLE OIL
STANOSTAMP
STANDARD PASTE COMPOUND



*Ask for
this
Booklet*

**"Lubrication in Honing
and Lapping"**

It discusses the increased importance of honing and lapping in present day metal working operations, outlining briefly the modern equipment, abrasives and lubricants used. A well illustrated practical manual of definite interest to those charged with reducing operating costs. This and other booklets listed below are waiting for you. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois.

"Lubrication in Gear Cutting"
"Lubrication in Grinding"

"When I grow up I think I'll be A Lubrication Engineer!"



WHY, sonny?

What's the plot of those mental movies a lad sees in his dreams of some day being a plane pilot, a ship's captain, a cow-puncher, or an engineer? Is it to grab a role glittering with *personal effectiveness* to a degree that, to him, seems magic? Something like that.

This boy's dad is a Standard Lubrication Engineer. Now, that doesn't make his dad a hero to you and me. But the boy only hears about "jobs to be done" in vague industrial wonderlands far away, and about "results achieved" expressed in money-amounts that would make mountains, in pennies! His fresh young mind wings happily unaware of facts like these:

The Lubrication Engineer comes to see you when you phone for him, or ask for him

through any Standard Oil representative. If you have a specific problem, he does his best to solve it for you, and usually succeeds. If you have an "exploring" type of mind and want a survey made to see what *new* economies can be *uncovered*, he settles down to work with you until that job is done. In neither case are you obligated in any way.

He achieves new lubrication savings for you in simple, practical ways. There's no "academic mystery" about the way a Standard Lubrication Engineer works. He simply adds *his* experience to your own. When he's through, he makes his recommendation. You take it or leave it.

There's no "magic mountain" about the savings he can achieve for you—although savings on lubrication, because they go on and on and on, are the kind that, small perhaps at first, do mount like magic . . .

Copr. 1937, Standard Oil Co.

STANDARD OIL COMPANY (INDIANA)

CORRECT LUBRICATION

2

n

re-
fic
it
an
ey
be
rou
are

for
no
l-
in-
en
on.

the
av-
on
at

Co.